BYSSINOSIS: EVALUATION OF SCIENTIFIC AND TECHNOLOGICAL ISSUES

HEARING

BEFORE THE

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INVESTIGATIONS AND OVERSIGHT

OF THE

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BYSSINOSIS: EVALUATION OF SCIENTIFIC AND TECHNOLOGICAL ISSUES

WEDNESDAY, SEPTEMBER 22, 1982

House of Representatives,
Committee on Science and Technology,
Subcommittee on Investigations and Oversight,
Washington, D.C.

The subcommittee met, pursuant to notice, at 11:26 a.m., in room 2325, Rayburn House Office Building, Hon. Albert Gore, Jr. (chairman of the subcommittee) presiding.

Present: Representatives Gore, Volkmer, and Walker.

Mr. Gore. The subcommittee will come to order.

I would like to begin with an apology to our witnesses and all of our guests. The schedule of the House has been rearranged, in large part because of the rail strike and the need for emergency legislation, and as a result, hearings and other proceedings all over the House have been disrupted this morning, and I apologize to you.

Almost 300 years ago, Bernadino Ramazzini, an Italian physician, first noted byssinosis-like symptoms in textile workers. Byssinosis, or brown lung disease as it is commonly called, was not, however, widely recognized as an occupational disease of major importance in this country until the 1960's.

The Department of Labor estimated in 1979 that almost 600,000 workers were exposed to cotton dust in the United States, and that there were 84,000 cases of byssinosis among active textile workers. Thirty-five thousand active and retired textile workers were considered totally disabled with severe chronic lung disease.

By most accounts, byssinosis in its most serious form is a chronic and irreversible obstruction of the lung airways. It is clinically similar to bronchitis or emphysema and can be severely disabling.

Mr. Roy Dowdy, a brown lung victim from Virginia, recently testified before this subcommittee on the effects of exposure to cotton dust at a hearing we held on pollution compensation. Mr. Dowdy described the typical symptoms of a byssinotic, and I want to quote from him:

> I would get choked up at times, and I'd have to move to a window so I could breathe. On my way to the car, it was slow a lot. I would have to stop as much as two times to rest to get to my car. My breath was getting shorter all the time.

Well, now, while medical science has come a long way in its understanding of the relationship between exposure to cotton dust and byssinosis since Ramazzini first wrote on byssinosis so many years ago, uncertainties still exist. For example, neither the exact cause—that is, the exact elements within the irritant that cause byssinosis—nor the progression of the disease from the acute to the chronic stage is well understood.

However, the existence of byssinosis has by most accounts been well documented, and byssinosis can be prevented. Byssinosis, in fact, was one of the expressly recognized health hazards that led to the passage of the OSHA Act in 1970.

In 1978, the Occupational Safety and Health Administration issued a revised cotton dust standard after a rulemaking proceeding that lasted over 40 months. The standard set permissible exposure levels for the cotton textile industry at 200 micrograms of dust per cubic meter of air for yarn manufacturing and 750 micrograms of dust per cubic meter of air for slashing and weaving. The U.S. Supreme Court upheld the permissible exposure levels in June 1981.

Early in the Reagan administration, the cotton dust standard had been targeted for review by the President's regulatory reform task force. In March 1981, the new OSHA leaders announced that the agency was reviewing the cotton dust standard from a cost-benefit perspective. That review was halted, however, when the Supreme Court upheld the PEL in June.

In February 1982, OSHA again announced its intention to review the cotton dust standard. This time, OSHA announced, "new health data," had come to its attention that warranted reconsideration of the cotton dust standard. What exactly was this "new health data"? How credible is it? What have the OSHA and NIOSH scientific staff and others in the scientific community said about this new health data? How was the data reviewed within OSHA? These are some of the questions we will be exploring today with our panel of scientists.

In addition to our panel on science, we will hear from others about the implementation of the cotton dust standard and the progress made by industry toward compliance with it. We will also hear about the standard's impact on productivity in the textile industry. There are some interesting findings there.

As we examine the science and technology of byssinosis, these questions will be paramount: What is the weight of the evidence on the relationship between cotton dust and byssinosis? Second, is the technology to control cotton dust available, and what has been the impact of the implementation of the cotton dust standard? Third, does OSHA use its scientific staff and that of NIOSH in evaluating health effects data? Fourth, was the quality of the new health effects data in the cotton textile industry of sufficient validity or impact to justify use of limited scientific resources to reopen the record on the cotton dust standard?

The panelists here today are abundantly qualified to shed some light on these and other issues.

Without objection, I would like to include the opening statement of our ranking minority member, Mr. Walker, in the record at this point.

[The opening statement of Mr. Walker follows:]

OPENING REMARKS OF REPRESENTATIVE ROBERT S. WALKER

SEPTEMBER 22, 1982

GOOD MORNIG MR. CHAIRMAN, I WOULD LIKE TO JOIN YOU IN WELCOMING OUR WITNESSES HERE THIS MORNING. IT APPEARS THAT THIS MIGHT BE A BUSY DAY HERE ON CAPITOL HILL, AND I WANT OUR WITNESSES TO KNOW THAT WE HAVE A NUMBER OF THINGS TO ATTEND TO TODAY AND IF WE HAVE TO LEAVE THE ROOM IT WILL BE BECAUSE OF THE PRESS OF OTHER DUTIES.

OUR HEARING TODAY IS A UNIQUE EXAMPLE OF THE PROBLEMS FACING THE FEDERAL REGULATORY PROCESS. CHAIRMAN GORE AND I MAY OFTEN DISAGREE ON MANY THINGS CONCERNING THE ROLE OF THE FEDERAL GOVERNMENT IN REGULATING OUR EVERYDAY LIVES. BUT, WE BOTH AGREE THAT THERE IS A PROPER FEDERAL ROLE IN THE PROTECTION OF HEALTH AND WELFARE.

IN PREVIOUS HEARINGS WE HEARD FROM VICTIMS OF THIS TRAGIC DISEASE. PEOPLE WHO ARE INCAPACITATED, PEOPLE WHO CANNOT EARN A LIVING, PEOPLE WHO ARE VICTIMS IN THE CLASSIC SENSE OF THE WORD.

TODAY ONE OF OUR POINTS OF FOCUS WILL BE THE PROPOSALS NOW BEING CONSIDERED IN OSHA TO RELAX THE PRESENT COTTON DUST STANDARD. THIS REVIEW IS ONLY PART OF AN OVERALL UNDERTAKING BY THE ADMINISTRATION TO REVIEW CURRENT FEDERAL REGULATIONS AND TO MODIFY, OR CANCEL THOSE WHICH ARE NOT JUSTIFIED. THIS IS AN INITIATIVE WHICH I SUPPORT WHOLEHEARTEDLY.

BUT THE PROBLEM IN THE CASE OF THE COTTON DUST STANDARD IS REACHING A POINT WHERE PROPONENTS AND OPPONENTS ARE CHARGING THAT THE SCIENTIFIC DATA BASE IS FAULTY. AND THIS IS A SERIOUS CHARGE WHICH GOES TO THE HEART OF THE SCIENTIFIC PROCESS.

AT LEAST PART OF OUR AGENDA THIS MORNING MUST BE TO EXAMINE BOTH THE CHARGES, AND THE COUNTER CHARGES, CONCERNING THE RECENT NAS REPORT. I MUST ADMIT THAT IN MOST QUARTERS THIS REPORT HAS

WON GENERAL ACCEPTANCE, BUT THERE REMAIN SOME SERIOUS QUESTIONS ABOUT THE ACCURACY OF THE FINDINGS CONCERNING CHRONIC HEALTH EFFECTS OF COTTON DUST.

THIS CONTROVERSY HAS SPREAD THROUGH THE SCIENTIFIC COMMUNITY AND THERE IS ALREADY THE START OF A FORMATION OF SIDES ON THIS ISSUE. TO ADD TO THE PROBLEM I HAVE BEEN GIVEN SOME INDICATIONS THAT THE WORLD HEALTH ORGANIZATION WILL SHORTLY ISSUE THEIR OWN REPORT ON THIS ISSUE WHICH WILL PROBABLY REFUTE THE NAS STUDY.

THE PROBLEM HERE IS ONE WHICH MERITS OUR ATTENTION BECAUSE IT IS INDICITAVE OF THE LARGER PROBLEM OF SCIENTIFIC INTEGRITY. WE HAVE GONE TO GREAT LENGTHS TO ESTABLISH ORGANIZATIONS SUCH AS THE NATIONAL ACADEMY OF SCIENCES AND THE OFFICE OF TECHNOLOGY ASSESSMENT SO THAT THEY CAN GIVE THE CONGRESS AND THE GOVERNMENT A TRULY IMPARTIAL ANALYSIS OF SCIENTIFIC ISSUES. UNFORTUNATELY, AND PERHAPS TRAGICALLY, IT DOES NOT ALWAYS WORK OUT THAT WAY.

WE HAVE LEARNED THAT THERE ARE TIMES THAT INDIVIDUAL EMPLOYEES ALLOW THEIR OWN BELIEFS TO INFLUENCE THEIR FINDINGS, AND SOMETIMES IT APPEARS THAT AN AGENCY WHICH COMMISSIONS A STUDY, AND PAYS FOR IT, CAN HAVE AN UNDUE INFLUENCE ON THE SELECTION OF PARTICIPANTS.

AS WE LISTEN TO OUR WITNESSES TODAY WE SHOULD EACH BE ATTEMPTING TO BALANCE WHAT THEY SAY, TO RESOLVE CONTRADICTIONS, AND FINALLY, WE SHOULD BE ATTEMPTING TO CREATE A RECORD WHICH WILL MAKE IT POSSIBLE FOR DECISION MAKERS TO COME BACK AND EXAMINE THE RECORD AND SAY "THEY HELPED TO CLEAR UP CONFUSION, AND THUS MAKE IT POSSIBLE TO MAKE CORRECT REGULATORY DECISIONS."

AT THIS POINT MR. CHAIRMAN, I DO NOT KNOW WHAT THE PROPER

DECISION CONCERNING COTTON DUST WILL BE. I KNOW THAT THERE IS CONSIDERABLE BELIEF OUT THERE THAT COTTON DUST IS EITHER THE PRIME CAUSE, OR A MAJOR CONTRIBUTING CAUSE OF BYSSINOSIS. I KNOW THAT THE CURRENT STANDARD SEEMS TO BE HELPING REDUCE THE INCIDENCE OF THIS DISEASE IN TEXTILE WORKERS. AND I KNOW THAT THE STANDARD CAN BE ATTAINED IN MOST CASES WITHOUT UNDUE ECONOMIC HARDSHIP, IN FACT, I AM INFORMED THAT BURLINGTON INDUSTRIES, A MAJOR PRODUCER IS ALREADY REACHING 95 PERCENT COMPLIANCE.

MR. CHAIRMAN, OUR HEARING TODAY IS IMPORTANT BECAUSE WE ARE ONLY NOW BEGINNING TO UNDERSTAND THE TRAGIC CONNECTION BETWEEN MANY WORKPLACE EXPOSURES AND CHRONIC ILLNESS. HUNDREDS, IF NOT THOUSANDS, OF INDUSTRIAL POLLUTANTS WHICH WERE ONCE CONSIDERED SAFE ARE NOW UNDER POWEREFUL SCRUTINY. OFTEN IT IS DIFFICULT, IF NOT ALL BUT IMPOSSIBLE TO ABSOLUTELY PROVE ABSOLUTE CAUSATION. BUT WE ARE LEARNING THAT MANY SUBSTANCES ONCE THOUGHT BENIGN, ARE IN FACT, VERY DANGEROUS.

WE IN THE GOVERNMENT HAVE AN OBLIGATION TO THE PEOPLE OF THIS NATION TO TAKE ALL NECESSARY STEPS TO SAFEGUARD THE PUBLIC HEALTH AND WELFARE. I HOPE THAT OUR EFFORTS HERE TODAY WILL MAKE IT POSSIBLE FOR US TO MEET THAT OBLIGATION.

Mr. GORE. Without objection, I would like to, at the suggestion of staff, include a recent review of these issues in Science magazine at this point in the record, and without objection, we want to include some related documents in the record at this point, and we will have those reviewed by staff.

[Material to be provided follows:]

OSHA REVIEWING COTTON DUST STANDARDS—THE AGENCY MAY BE RELYING ON FLAWED STUDIES TO JUSTIFY WEAKENING THE RULES, CRITICS ARGUE

Critics of the Occupational Safety and Health Administration (OSHA) are worried that the agency may take advantage of a current review of cotton dust standards to relax present regulations. This could thus jeopardize the claims of thousands of workers who have filed for disability because they suffer from brown lung disease or byssinosis, a severe respiratory illness.

OSHA is scheduled to propose revised cotton dust standards by the end of the year and some scientists and labor groups are concerned that the agency is relying heavily on a handful of reports that they claim are seriously flawed—including a study by the National Academy of Sciences on byssinosis research.

J. Donald Millar, director of the National Institute for Occupational Safety and Health (NIOSH), recently attacked the byssinosis study in a letter written to Academy president Frank Press. "This document is both depressing and distressing," Millar remarked in a letter dated 25 August. "It is depressing in its narrowness of viewpoint, in the superficiality of its review of the literature and in the glibness of its tone. It is most distressing from the point of view of public health and preventative medicine." Millar called for a second panel to examine the issue again.

OSHA's review of the cotton dust standard is the subject of a hearing on 22 September before the House investigations and oversight subcommittee of the Science and Technology Committee. The subcommittee, chaired by Albert Gore, Jr. (D–Tenn.), will hear testimony from many of the chief actors in the cotton dust debate. The witness list includes Millar; James Merchant, a leading scientist in byssinosis research; Jerome Kleinerman, chairman of the Academy's byssinosis committee; and labor and industry leaders.

OSHA stated last February that "new health data" might necessitate changes in cotton dust regulations that were originally issued in 1978 under the Carter Administration. The health data, however, were never specifically identified in the agency's notice in the *Federal Register*. According to John Martonik, OSHA's deputy director of health standards, the information included reports on byssinosis by the Academy and the textile industry, but he declines to say how much significance the agency is placing on the reports.

The Academy study, in particular, has upset many researchers of brown lung disease because it failed to state clearly that the disease, as a chronic ailment, is directly related to cotton dust exposure. This correlation is widely accepted by most epidemiologists in byssinosis research. It was also recognized by OSHA when it set down the cotton dust standards in 1978.

But the Academy report, a $100,000 study sponsored by the Department of Agriculture and published in February, said that the relationship between exposure and chronic respiratory disease has yet "to be resolved." The conclusion was hotly contested by committee member Kaye H. Kilburn, director of pulmonary and environmental medicine at the University of Southern California and an epidemiologist who has extensively studied brown lung disease. He wrote in a minority report that it was "not defensible" to doubt or deny that the chronic ailment is linked to cotton dust exposure.

Several other epidemiologists not on the panel also protested the Academy's findings. They said in a joint statement in March that the study "is a misleading representation of the current state of knowledge of byssinosis." The cosigners were James Merchant of the University of Iowa, Richard Schilling of Britain's Medical Research Council, Gerald J. Beck and E. Neil Schachter of Yale, and David H. Wegman of Harvard's School of Public Health.

Kilburn said in a recent interview, "Things we thought were cast in concrete started to become fluid again. I didn't think the report was fair-minded." He and Merchant, who have collaborated on byssinosis research, and the Amalgamated Clothing and Textile Workers Union contend that the 12-member panel was not balanced in scientific expertise. Kilburn, for example, was the only epidemiologist selected from the many who have concluded from their own research that chronic byssinosis is directly related to cotton dust exposure. The only other epidemiologist on the Academy committee was Hans Weill, a professor at Tulane University School of Medicine. He believes that the relationship has yet to be demonstrated definitively and argues that respiratory illness is associated with the environment of a particular mill rather than cotton dust exposure per se.

The textile workers union charges that the Academy panel was tilted heavily in favor of industry. Eric Frumin, safety and health director of the union, points out that Weill conducted a lengthy study on workers that was funded by the American Textile Manufacturers Institute, the industry's chief lobbying group. Two other committee members, Raymond Fornes and Solomon Hersh, are from North Carolina State University's School of Textiles which receives hefty support from industry, Frumin says. He charges that Mario Battigelli of the University of North Carolina has testified on behalf of industry at hearings in 1977 on cotton dust standards. Battigelli said in an interview that he did testify at the invitation of industry but he did not receive any compensation for his appearance, even for travel expenses.

Some scientists who peer-reviewed the Academy report also faulted its conclusions, but their specific complaints are unknown. Academy president Frank Press said obscurely in a covering letter that the reviewers and the committee "were not able to resolve completely the differences of opinion. [T]he difference * * * is of social significance."

Academy officials respond that the committee members were selected for their varying opinions and expertise on a sensitive issue. The report was "a nice, balanced statement," said Daniel Weiss, the Academy's staff member who was executive secretary to the committee. He said that Kilburn's criticism took everyone by surprise and that Merchant's comments were simply sourgrapes because he was not asked to participate. Merchant replied that if the report's conclusion had been different, he would have no problems with the study.

The textile workers union and others also criticize two health surveys conducted by the American Textile Manufacturers Institute and submitted to OSHA for review. Based on information reportedly culled from 150,000 workers the industry group concluded that the problem of byssinosis was far less significant than expected. The National Institute for Occupational Safety and Health looked over the results and wrote a withering critique of the survey's methods. In a memo to OSHA, agency officials said that the survey design employed by [industry] "violated basic premises of epidemiology. NIOSH recommends to OSHA that these surveys be disregarded as credible scientific investigations * * *."

An industry official said that the survey was admittedly a "quick and dirty summary" that was not meant to be a definitive study.

The industry group also recently submitted another report to OSHA, this one by Harold Imbus, the former medical director of Burlington Industries. Like the survey, the study concludes that brown lung disease is not as prevalent as predicted. According to OSHA scientists and the textile workers union, the study has some serious drawbacks. Gore is expected to question industry and Imbus at length about the study at the upcoming hearing.

Another study that will add to the continuing controversy over the cotton dust standard is a recent byssinosis study by the World Health Organization. In contract to the Academy's report, a committee of international scientists chaired by Merchant, examined virtually the same information and arrived at a different conclusion: chronic byssinosis is caused by cotton dust exposure.

It is difficult to speculate what weight OSHA is placing on any of the reports. OSHA's Martonik is vague but hints that the cotton dust standard may not change drastically. He said that the Academy report represents the best opinions in the field but other reports must be considered as well. The industry survey, he said, provides "an indication of conditions, but is not a final analysis." Martonik said that OSHA has been concentrating its efforts more heavily on the nontextile segment of the industry and whether it should be regulated. Knitting, hosiery, and waste-processing factories are currently exempt from the cotton dust standards.

Nevertheless, many scientists and the labor union are nervous that OSHA plans to weaken the regulations that govern the textile industry. They note that President Reagan is keeping his promise to seek regulatory relief for industry and that OSHA administrator Thorne Auchter has been a good team player.

Mr. GORE. Now, let me say at this point that it seems that when we deal with OSHA, unusual things seem to happen at these hearings. We had a hearing some time ago at which some unusual events took place, and here again today, I must say that Thorne Auchter, the Assistant Secretary for OSHA, was scheduled to be here at 10:30 and had agreed to be here, but at 11:15, we were provided with a letter saying that he has been taken ill and will not be able to come.

The subcommittee extends our best wishes for a speedy recovery to Mr. Auchter, and we do look forward to hearing from him on another occasion, and I want to assure those present here that we will hear from him on another occasion, just as soon as his medical condition makes that possible. We would offer the services of Dr. Robins to prescribe any treatments that might speed his recovery. But, seriously, we do wish him the best and hope that he does make a speedy recovery.

Mr. GORE. Our first panel of witnesses consists of Dr. Harold Imbus, with the Health & Hygiene, Inc., in Greensboro, N.C.; Prof. James Merchant, a doctor at the College of Medicine at the University of Iowa; Dr. Jerome Kleinerman, chairman of the department of pathology at Mount Sinai Medical Center; and Dr. Donald Miller, director of the National Institute for Occupational Safety and Health.

Gentlemen, if you would stand and be sworn, I would appreciate it.

[Whereupon, members of the panel stood and were duly sworn.]

Mr. GORE. Thank you very much.

Dr. Imbus, you have recently performed a study for the textile industry, is that correct?

Dr. IMBUS. That is correct?

Mr. GORE. We will begin with you, then, and without objection, the entire text of your prepared statement will be included in full at the record at the conclusion of the oral presentations of all of the panelists. If you care to summarize any of it, that is acceptable to us. If you want to present it all as written, that is fine, too; we will leave it up to you.

STATEMENTS OF HAROLD IMBUS, M.D., SC.D., HEALTH & HYGIENE, INC.; PROF. JAMES A. MERCHANT, M.D., COLLEGE OF MEDICINE, UNIVERSITY OF IOWA, JEROME KLEINERMAN, M.D., CHAIRMAN, DEPARTMENT OF PATHOLOGY, MOUNT SINAI MEDICAL CENTER, AND DONALD MILLAR, M.D., DIRECTOR, NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH, CENTERS FOR DISEASE CONTROL

Dr. IMBUS. Good morning. My name is Harold Imbus. I am an occupational physician, and my company provides consultation to a wide variety of industries including the textile industry.

Prior to the establishment of this company in January of this year, I was director of safety and health for Burlington Industries for 12 years.

The viewpoints presented today are entirely my own and are based upon approximately 13 years of experience with the byssinosis issue.

Mr. Chairman, it is obvious from your letter inviting me to participate in this panel that you, as almost every other observer in this issue, have been perplexed by the apparent contradictory information and the heat of the debate regarding this issue. While I have been involved since the early days of concern with this issue—indeed, have been a party to much of the debate and a proponent of the viewpoint—I would submit to you that there is more common ground on this issue than at first glance meets the eye.

Many of the apparent discrepancies are due to the vantage point of the observer, both in terms of time and place, than to glaring discrepancies of data.

In 1970, Duke University and the State of North Carolina conducted a study within Burlington Industries to determine the prevalence of byssinosis. This study, though done in cooperation with the company, was entirely independent of it in terms of its methodology, data collection, and interpretation of results. Nevertheless, it was conducted within my full view as medical director of the company at that time.

Subsequent to the initiation of the preliminary phases of the study, Burlington Industries' management directed that medical surveillance programs be extended to all employees, not just those included in this study, who were exposed to processing of raw cotton. It was my responsibility at this time to implement and conduct this program of surveillance. All together, the company surveillance program included over 10,000 employees in addition to the approximately 3,000 employees included in the Duke/North Carolina work.

The Duke/North Carolina study has resulted in several publications. In addition, I have published the results of the findings of the Burlington medical surveillance on a number of occasions.

Although the Duke/North Carolina study was ultimately used to set the current OSHA standard, and though I have been a party to debate of the interpretation of that study and its use in the standard, in actuality many of the results that I have found are quite similar to those of the Duke/North Carolina study. In fact, many other studies conducted by industry, government, and academic groups in this and other countries prior to an since 1970 derived similar results, particularly for acute effects.

What I have taken issue with is, first, the concept that you can set a dust level and then predict the response. The raw materials—that is, grade of cotton versus cotton synthetic blends, et cetera—are just too variable to do that.

Second, I have found little overall dose response in the range between 200 and 500 micrograms. This to me is not surprising because dose responses are usually not straight lines and tend to plateau at lower levels.

When one considers the chronic effects of cotton dust exposure, agreement narrows and the areas of disagreement widen. However, even here there are many scientists and physicians, including myself, who believe that under some circumstances cotton dust creates chronic irreversible lung impairment. Some believe proof of this is inadequate; nevertheless, most scientists and physicians accept that premise that irreversible lung disease may result as an operating principle in order to protect workers.

The magnitude and number of workers affected by any chronic damage due to cotton dust, however, is a matter of intense controversy, and with some groups contending that many thousands are affected, while others believe that only a small proportion of the work force has been permanently affected.

One of the reasons for this controversy is that it is extremely difficult, with our present state of knowledge, to determine the relative proportion of a person's lung disease attributable to cotton dust versus other factors.

I might also add that the types of epidemiologic studies which could settle this controversy probably will not be forthcoming, at least in the United States. Improvements in the control of byssinosis have been of such magnitude and so effective that we simply will not have the opportunity to do a prospective study with the population exposed sufficiently to make these determinations. I, of course, look upon this as a very positive development.

I would therefore hope that we would shift our focus from a question of whether cotton dust can create irreversible harm to the issue which is most important for the present and the future; namely, has any adverse health problem been reduced or eliminated, and if so, can workers in the cotton industry at the present time be given reasonable assurance that they will not suffer impairment of their lungs due to exposure to cotton dust?

A study published by me in the 1970's focused upon the adverse health effects of cotton dust prior to the implementation of controls. Since then, I and others of my colleagues have been able to demonstrate a marked decrease in the number of employees appearing to have acute reactions from cotton dust and in the number of employees who have lung impairment over the period of years since the institution of these controls.

Unfortunately, our present focus upon studies of populations exposed in the 1940's, 1950's, and 1960's, prior to the implementation of these controls, causes us to lose sight of the remarkable results that have been achieved to protect employees against the effects of cotton dust exposure. I might say that if only we devoted a partial amount of our resources to looking at the present picture as we do in our endless debate of these earlier studies, we might have resolved many of the issues by now.

In the years that I worked for Burlington Industries, I kept tabulations of the numbers and percentage of employees with acute reaction and similar percentage for those with chronic lung impairment. It was readily apparent to me that the numbers and percentages of employees who were affected were becoming remarkably small; generally less than 1 percent. When I left Burlington Industries and when OSHA decided to reopen the cotton dust standard, I was asked to compile the results of medical surveys of a number of companies, including those of my previous employer.

Acute dose-response relationships observed in this study are much weaker and of smaller magnitude than those previously recorded, including those done by this author. It is believed that this is due to the fact that dust levels are now at the lower end of the spectrum and at a relatively flat portion of the dose-response curve. This improvement in exposure has been combined with adequate medical surveillance. All together, the total percentage of individuals having any symptoms of byssinosis is 0.68 percent. The total percentage who have a temporary decline—that is, 10 percent or more—in their 1-second forced expiratory volume during the shift is 2.9.

Chronic pulmonary function problems were evaluated, also, and these data failed to reveal that the present population had any increase in the percentage of employees with impairments by dust level category. The percentage of workers with impairments, however, is markedly related to their smoking category.

Again, I believe this indicates that now that an environmental factor has been controlled, nonenvironmental factors, namely smoking, will predominate in the genesis of lung disease among cotton workers.

Another indicator of possible chronic effect is the percentage of employees with bronchitis. Again, the relationship also appears to be with smoking versus nonsmoking and not with the dust level category of the work area. When either of the chronic effects is compared with nontextile populations, the textile population compares favorably; that is, has less chronic effects.

Now, whenever one does such a pooling of data, there are certain problems that arise due to possible inconsistencies in the collection of the data. I was fully aware of these pitfalls when I undertook the task; in fact, I pointed out some of them in the presentation myself. Nevertheless, the results of these pooled data, including over 40,000 workers, were very similar to the data which I was familiar with over the years in Burlington Industries and for which I had good knowledge of the procedures and many of the demographic characteristics of the population.

Therefore, I concluded that these pooled data accurately reflect the conditions in these companies which were studied and are reflective of the situation where adequate controls combined with medical surveillance have been instituted.

Subsequent to the submission of this report, the National Institute of Occupational Safety and Health has written a review of the report in which it criticized the methodology of collecting the data and concluded—this second submission by ATMI should be disregarded by OSHA in its rulemaking effort.

I have written a detailed response to these criticisms and conclude that though they may be points of concern to some distant and anonymous scientist, they do not invalidate the basic results in the data. In fact, I was not so much surprised by NIOSH's criticisms of the methodology, which I fully expected, as their failure, because of these alleged problems, to even look at or otherwise consider the data. This failure to consider the only U.S. data collected in the past 8 years on a large number of people, a considerable proportion of which was collected by this author, and which, when compared to earlier data collected by this same author, is drastically different, is, in my opinion, reflective of the cavalier, misinformed, and generally unconstructive approach which has characterized NIOSH's handling of the whole cotton dust issue.

You have asked me to comment upon ATMI's comments in response to OSHA's February 1982 advance notice of proposed rulemaking. May I respectfully say that, as one not directly connected with the ATMI, this could better be done by the ATMI. However, I have had experience with the ATMI over the past 12 years, and I have sat on a number of committees where I have reviewed various positions with them, and generally I am supportive of their position on the cotton dust standard.

You have asked me to comment on the review prepared for the ATMI by Epidemiology Resources, Inc., of the April 1981 byssinosis study conducted by Dr. Gerald Beck and others at Yale University. May I respectfully indicate that I do not believe that it is appropriate for me to critique a critique of another's work. I am, however, aware of the report, and I am aware of the concerns of the Yale study expressed in the report.

I might also indicate that even prior to such report I have had some of these same concerns. However, my major concern with the Yale work is that it is being projected to the present day, grossly exaggerating the problem. The study deals with no one who had not been employed for 3 years prior to 1955, fully 30 years ago, and 25 years prior to the implementation of controls in most industries. Regardless of any considerations of whether or not the study is valid, it is a totally inappropriate study for OSHA's consideration of a rulemaking effort at this time.

Mr. Chairman, I have been involved with and concerned about the cotton dust issue for many years. I came here today, on my own, due to a letter which I received from you, a letter which I thought was very thoughtful and very concerned about the issues. Unfortunately, when I read a news release here about this hearing, I had two concerns: No. 1, might I be in the wrong hearing? No. 2, was this letter that I received not reflective of what this hearing is all about. I certainly hope those concerns are wrong.

I think remarkable advances have been made in the protection and control of byssinosis. I recognize that there are many other areas of remaining concern to which you are addressing yourself. I think it is healthy that we assess our position periodically, and I am for a strong standard, but I do concur with OSHA's efforts to reevaluate the standard. I hope that OSHA will open its eyes to all the information, and I hope the information presented today will be helpful to your committee in guiding future efforts by the Government.

Thank you.

[The prepared statement of Dr. Imbus follows:]

TESTIMONY OF HAROLD R. IMBUS, M.D., SC.D.

HEALTH & HYGIENE, INCORPORATED

My name is Harold R. Imbus. I am an occupational physician. My company provides occupational health consultation to a wide variety of industries, including the textile industry. Prior to establishment of this company in January of this year, I was Director of Safety and Health for Burlington Industries for twelve years.

The viewpoints presented today are entirely my own and are based upon approximately thirteen years of experience with the byssinosis issue.

Mr. Chairman, it is obvious from your letter inviting me to participate in this panel that you, as almost every other observer of this issue, have been perplexed by the apparent contradictory information, and the heat of the debate, regarding this issue. While I have been involved since the early days of concern with this issue, indeed have been a party to much of the debate, and a proponent of a viewpoint, I would submit to you that there is more common ground on this issue than at first glance meets the eye.

Many of the apparent discrepancies are due more to the vantage point of the observer, both in terms of time and place, than to glaring discrepancies of data.

In 1970, Duke University and the State of North Carolina conducted a study within Burlington Industries to determine the prevalence of byssinosis. This study, though done in cooperation with the company, was entirely independent of it in terms of its methodology, data collection, and interpretation of results. Nevertheless, it was conducted within my full view as Medical Director of the company at that time. Subsequent to the initiation of the preliminary phases of study, Burlington Industries' management directed that medical surveillance programs be extended to all employees (not just those included in the study) who were exposed to processing of raw cotton. It was my responsibility at this time to implement and conduct this program of surveillance. Altogether, the company surveillance program included over 10,000 employees, in addition to the approximately 3,000 employees included in the Duke/North Carolina work.

The Duke/North Carolina study has resulted in several publications. In addition, I have published the results of the findings of the Burlington medical surveillance program on a number of occasions.

Although the Duke/North Carolina study was ultimately used to set the current OSHA standard, and though I have been a party to the debate of the interpretation of that study, and the standard, in actuality many of the results that I have found are quite similar to those of the Duke/North Carolina study. In fact, many other studies conducted both by industry, government, and academic groups in this and other countries prior to and since 1970 derived similar results, particularly for acute effects.

Most who are knowledgeable and have been involved with this problem agree that cotton dust creates a reaction characterized by spasm of the airways and manifests itself by tightness in the chest and/or a temporary decline in pulmonary function. Most agree that this is generally related to the dosage of the cotton dust. In addition to dosage, other substances such as synthetics and bacterial contamination affect the response. In fact, for similar types of work areas with similar types of raw materials, the percentage of workers responding either with tightness in the chest, or temporary decline in pulmonary function were similar.

What I have taken issue with is first, the concept that you can set a dust level and thus, predict the response. The raw materials (grade of cotton versus cotton synthetic blends) are too variable to do that. Secondly, I have found little overall dose response in the range between 200-500 micrograms. This is not surprising because dose responses are usually not straight lines, and tend to plateau at lower levels.

When one considers the chronic effects of cotton dust exposure, agreement narrows and the areas of disagreement widen. However, even here there are many scientists and physicians, including myself, who believe that under some circumstances cotton dust creates chronic irreversible lung impairment. Some believe proof of this is inadequate; nevertheless this group of scientists accepts that premise as an operating principle to protect workers. The magnitude and number of workers affected by any chronic damage however, is a matter of intense controversy, with some groups contending that many thousands are affected, while others believe that only a very small proportion of the work force has been permanently affected.

One of the reasons for this controversy is that it is extremely difficult with our present state of knowledge to determine the relative proportion of a person's lung disease attributable to cotton dust versus other factors such as smoking. I might also add that the types of epidemiologic studies which could settle this controversy probably will not be forthcoming, at least in the United States.

Improvements in the control of byssinosis have been of such magnitude and so effective that we simply will not have the opportunity to do a prospective study with population exposed sufficiently to make these determinations. I, of course, look upon this as a very positive development.

I would, therefore, hope that we could shift our focus from a question of whether cotton dust can create irreversible harm to the issue which is most important for the present and future; namely: "Has any adverse health problem been reduced or eliminated, and, if so, can workers in the cotton industry at the present time be given reasonable assurance that they will not suffer impairment of their lungs due to exposure to cotton dust?"

A study published by me in the 1970's focused upon the adverse effects of cotton dust prior to the implementation of controls. Since then, I and others of my colleagues have been able to demonstrate a marked decrease in the number of employees appearing to have acute reactions to cotton dust, and in the numbers of employees who have lung impairment over the period of years since the institution of these controls. Unfortunately, our present focus upon studies of populations exposed in the 40's, 50's, and 60's prior to the implementation of these controls causes us to lose sight of the remarkable results that have been achieved to protect employees against the effects of cotton dust exposure. I might say that if we only devoted a partial amount of resources to looking at the present picture as we do in our endless debate of these earlier studies we might have resolved many of the issues by now.

In the years that I worked for Burlington Industries, I kept tabulations of the numbers and percentage of employees with acute reaction and similar percentage for those with chronic lung impairment. It was readily apparent to me that the numbers and percentage of employees who were affected was becoming remarkably small, generally less than one percent. When I left Burlington Industries and when OSHA decided to reopen the cotton dust standard, I was asked to compile the results of medical surveys of a number of companies, including those of my previous employer. Altogether seven companies participated in the study which included 50,945 employees. One company did not have dust level data which could be combined with the pulmonary function data; therefore, its data was eliminated from this segment, leaving 41,473 employees. The medical results included the symptoms of tightness in chest, the temporary decline of pulmonary function that may occur during the shift, and the percentage of employees who have abnormal pulmonary function, as determined by standard criteria.

These results were then equated to various dust level measurements. Companies participating in this program have had medical testing programs for a number of years, are usually staffed by a full-time medical director and other full-time medical personnel, and exhibit a relatively high degree of sophistication in collecting and evaluating the data. I might also add that, to a considerable extent, the data offered is from companies who have made substantial improvements in both the environment and in their selection of workers and who believe in early intervention when a worker appears to be developing a problem. Therefore, I believe these results reflect these improvements and, as a whole, can in no way be construed to be an assessment of an employee population without intervention. I believe these results reflect the current situation in those companies which have well-developed programs to control the problem of cotton dust exposure.

Acute dose response relationships observed in this study are much weaker and of smaller magnitude than those previously recorded, including those done by this author. It is believed that this is due to the fact that dust levels are now at the lower end of the spectrum, and that this lower exposure has been combined with adequate medical surveillance. Altogether the total percentage of individuals having any symptoms of byssinosis is 0.68 percent. The total percentage who have a temporary decline (10 percent or more) in FEV1 during the shift is 2.9.

Chronic pulmonary function problems were evaluated in several ways. In the first place, percentage of employees showing significant impairment, including those showing moderate to severe impairment (FEV1 less than 60 percent) and those showing mild to moderate impairment (FEV1 between 60 and 80 percent) were tabulated. In addition, the mean percentage of predicted FEV1 for various dust level categories was also tabulated. These data failed to reveal that the present population had any increase in the percentage of employees with impairments by dust level category. The percentage of workers with impairments, however, is markedly related to smoking category. Again, I believe this indicates that now that an environmental factor has been controlled, non-environmental factors, namely, smoking will predomidate in the genesis of lung disease among cotton workers.

Another indicator of possible chronic effect is the percentage of employees with bronchitis. Again, the relationship also appears to be with smoking versus non-smoking and not with dust level category or work area. When either of the chronic effects are compared with non-textile populations, the textile population compares favorably; that is, has less chronic effects.

Now, whenever one does such a pooling of data, there are certain problems that arise due to possible inconsistencies in the collection of the data. I was fully aware of these pitfalls when I undertook the task; in fact, I pointed out some of them in the presentation itself. Nevertheless, the results of these pooled data including over 40,000 workers were very similar to the data which I was familiar with over the years in Burlington Industries, and for which I had good knowledge of the procedures and many of the demographic characteristics of the population. Therefore, I conclude that these pooled data accurately reflect the conditions in these companies which are reflective of the situation where adequate controls combined with medical surveillance have been instituted.

Subsequent to the submission of this report, NIOSH has written a review of the report in which it criticized the methodology of collecting the data and concluded, "...this second submission by ATMI, ...should be disregarded by OSHA in its rulemaking effort." I have written a detailed response to these criticisms and conclude that though they may be points of concern to a distant and anonymous "scientist," they do not invalidate the basic results of the data. In fact, I was not so much surprised by NIOSH's criticisms of methodology, which I expected, as their failure, because of these alleged problems, to even look at or otherwise consider the data. "For this reason this review will detail the shortcomings of the methodology rather than comment on any of the data presented in the more than 80 tables, figures, and exhibits." This failure to consider the only U.S. data collected in the past 8 years on a large number of people--a considerable portion of which was collected by this author--and which when compared to earlier data collected by this same author is drastically different--is, in my opinion, reflective of the cavalier, misinformed unconstructive approach which has characterized NIOSH's handling of the whole cotton dust issue.

You have asked me to comment upon ATMI's comments in response to OSHA's February 1982 advance notice of proposed rulemaking on the cotton dust standard. May I respectfully say that, as one not directly connected with the ATMI, that this could be done better by the ATMI. I have for approximately 12 years until the first of January of this year been a member of the ATMI Medical Subcommittee and the ATMI Health and Safety Committee. In such position, I have had opportunity to evaluate many ATMI positions and to comment on them. Whenever you have such a wide diversity of individuals as within ATMI, you will have some disagreements; however, I am generally supportive of ATMI's position with respect to the cotton dust standard.

You have asked me to comment upon the review prepared for the ATMI by Epidemiology Resources, Inc., of the April 1981 Byssinosis Study conducted by Dr. Gerald Beck and others at Yale University. May I respectfully indicate that I do not believe that it is appropriate for me to critique a critique of another's work. I am, however, aware of the report and am aware of the concerns of the Yale study expressed in the report; I might indicate that even prior to such report I have had some of these same concerns. However, my major concern with the Yale work is that it is being projected to the present day--grossly exaggerating the problem. The study deals with no one who had not been employed for three years by 1955, fully 30 years ago, and 25 years prior to the implementation of controls in most industries. Regardless of any considerations of whether or not the study is valid, it is a totally inappropriate study for OSHA's consideration of a rulemaking effort at this time.

Mr. Chairman, I have been involved with and concerned about the cotton dust issue for many years. I think remarkable advances have been made in detection and control of this condition. I recognize that there are many other areas of remaining concern, to which you are addressing yourself. I think it healthy that we assess our position periodically. I am for a strong standard but concur with OSHA's efforts to re-evaluate this standard. I hope that OSHA will open its eyes to all information. I hope that the information presented today will be helpful to your committee in guiding future efforts by the government.

RESPONSE TO REVIEW
BY
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
OF
"MEDICAL SURVEILLANCE DATA IN THE COTTON TEXTILE INDUSTRY"

In a recent review by NIOSH of the ATMI document entitled, "Medical Surveillance Data in the Cotton Textile Industry," NIOSH recommends that the data "be disregarded by OSHA in its rulemaking." In general, the criticism of the data appeared to evolve around the lack of central processing and interpretation of data. The author recognizes the problems with collection of data in a uniform fashion for pooling information. In addition, he recognizes the desirability of pooling and processing directly from raw data where practical. This was not practical in this case. Nevertheless, the data presented are consistent with a large body of data for which the author has had responsibility for twelve years, in which consistency of collection and processing were maintained. In view of consistent methods and consistent results of the data submitted to OSHA, the rejection of the data appears unwarranted. In the critique on page two, entitled "Assertainment," NIOSH leveled a number of specific criticisms at the methodology of the work. These are answered as follows:

1. "...Were all of these questionnaires administered by trained interviewers or were any self-administered?"

   --The questionnaires were administered in companies with medical departments staffed by full-time health professionals. Individuals administering the questionnaires are trained in a NIOSH-approved course. It is not the practice of these companies to have the questionnaires self-administered.

2. "Was the diagnosis of symptomatic byssinosis provided to the author by each plant for each individual, or did they themselves take the raw data and assign the results to a definition...?"

--The determination of symptomatic byssinosis was provided to the author by each company. The determination of criteria for assertainment of symptomatic byssinosis were developed in accordance with the criteria used during the original research for byssinosis in 1970 and were programmed in a computer so as to not leave room for observer bias. This program has been continuously used by the author during the course of the years and data from his former company represent a considerable segment of the population. In addition, at least one other company has utilized the same basic computer program. Through discussions with other participants (medical directors), it has been determined that similar criteria have been used by them. It would not have been possible in the short time period allowed to have actually individually evaluated the raw data. The similarity between the results of the author's former company and that of other participant companies makes it extremely unlikely that there are any notable differences in the sensitivity of the definition.

3. "Therefore, NIOSH is very concerned that the acute shift change data" (which were conducted 4-6 hours after beginning of the work shift) "may be inadequate to assess objective response to dust exposure due to the short time period between the pre- and post-shift examinations."

--In the work upon which the standard was based, "each employee returned to the same spirometer and repeated the sequence of forced expirations following 6 hours of exposure to the workroom air."1 Subsequent work by the same authors revealed a marked drop in FEV1 within 2 hours after exposure to cotton dust increasing until 6 hours of exposure.[2] It is very evident from this study that a substantial drop in a reactor employee would be obtained by 4 hours. The 4 hours minimum was apparently adopted by OSHA to give companies some latitude due to the difficulties which might be encountered with employees of one shift "bumping" into those on other shifts. The 4-6 hours mentioned in the report is a range of time for the beginning of the retest and does not represent a "cut-off" at 6 hours for completion of the retest. In fact, the author's company seldom started its second testing until 4 1/2 hours into the shift and the average would be closer to 6 hours rather than 4 hours. Questioning of some of the medical directors of other participant companies reveals that testing may be done up to 8 hours after the shift beginning. Therefore, retesting averages very close to 6 hours. It is also interesting to note the author's own studies were conducted identically in 1980-81 to those of 1970-71. In the earlier years, large changes in FEV1 were noted in the after tests using identical practices.

4. "If the 41,173 includes some individuals with technically unacceptable data, (pre- or post-shift or even questionnaire data), then readers should know to what extent data had to be thrown out. And if no data were thrown out either the

companies have perfect technicians, equipment and subjects or some technically unacceptable data have been included in the study."

--It is recognized that for a research study it is the practice to discard data which do not meet a pre-determined criteria. However, in a program where employees are required to be tested, it has not been the author's practice to discard data. Other companies use similar practices. The author has previously had this concern--expressed by NIOSH. He has evaluated data with and without this discarding of imperfect data. In fact, it does not make a great deal of difference except that if you discard data, the results will actually tend to become better; that is, there will be a lesser number of employees with low pulmonary function and "reactions." Therefore, by not discarding data, the worst possible picture is shown.

5. "For computing mean FEV1 shift changes, the data on a subset of 20,127 employees were used. This is fine if we knew that the subset was not markedly different from the initial 41,173 (or for that matter, 50,945). In fact, ATMI gives us no demo-

graphic background at all (sex, race, geography, age, job tenure) of any of the populations mentioned in the report."

--For the subset of 20,127 employees, we do have detailed data of age, length of employment, etc. The subset does not porport to do more than examine the population at more narrow dust level increments than was possible for the 41,173 population. When the same parameters are used for comparison of the subset with the overall group there is very little difference, nor are there substantial differences between the companies. We do not have detailed age, job tenure, etc. information on the larger group of 41,173 not included in the subset. However, in view of the similarities of results and the fact that approximately 50 percent of the population is covered by the subset, it is very unlikely that there would have been substantial differences in the characteristics. Furthermore, mean FEV1 shift changes have never been demonstrated, to this author's knowledge, to be related to age, length of employment, and sex. Therefore, though the criticism is not valid, for the sake of argument even if it were, it would be a meaningless criticism.

6. NIOSH is concerned with how the dust exposure values were assigned to each individual, and whether they were done on the precise day that the pulmonary function measurements were made. "Without knowing these answers, it is extremely difficult to judge how reliable that those response data are."

--Dust exposure levels are assigned to each individual based upon the mean dust level in the area in which the individual works. Participating companies take a number of vertical elutriator samples, over at least a 6 hour period, on three shifts. The average for a shift in a work area is assigned to that worker. Though unusual situations, such as blow down may temporarily alter these levels, the fact that the work areas are conditioned with a central air system results in relatively uniform distribution of dust within the area. This has been determined on a number of occasions. Dust levels are not necessarily done on precisely the same day upon which employees are tested. Nevertheless, some companies have the practice of doing dust level surveys in addition to those required in surprise audits and for various engineering control procedures. In addition, the company with which the author worked has done a number of research projects on variability of dust levels. Though there may be some day-to-day variations, it has been possible to establish with reasonable confidence the basic trend and characterization of a dust level exposure in a work place. The percentage of cotton content does not vary from day to day in the manufacturing operations, and any change in cotton content must be reported and a new survey take place. Actually, records are kept of the cotton content from year to year and of the known deliberate variations. Incidental day-to-day variations are not the case.

7. NIOSH criticizes the longitudinal data on two basis: 1) not a long enough period of time and 2) it has not been broken down into subgroups of age, sex, race, smoking, etc.

    1. There are two approaches to longitudinal data:
        a. studying a relatively small group of people for a considerable number of years;
        b. studying a larger group over a shorter period.

It is recognized that a long period would be desireable and, in fact, efforts are under way to do such. However, it is the author's contention that a serious excess annual decline in pulmonary function would have been demonstrated with such a large group even over a short period of time. Actually, the cohort was divided into age, sex, smoking, and dust level category. The slopes showed some steepening in smokers at older ages as would be expected.

On a broader sense, OSHA requested comments and information on the following:

a. What new epidemiologic studies on the effects of cotton dust and textile industries are presently available? What conclusions may be drawn from these studies?

b. Based upon medical surveillance data from workers in textile industries, what are the levels of risk of adverse health effects to those workers from exposure to cotton dust?

--NIOSH has criticized and recommended disregarding of the report because of perceived problems with epidemiologic methodology. The data, when it was collected, was never intended for a traditional epidemiological study. Concerns are justified when such data are pooled and used in a study. However, because of the reasons mentioned above, these concerns are not valid reasons for rejection of the study. Irregardless of any concerns of the report as an epidemiologic study, it clearly presents medical surveillance data from large numbers of workers in the textile industry in response to request "b" above. The author of the report was employed by the company that contributed a substantial amount of the data used in the report and that company has been collecting pulmonary function data on large numbers of employees for approximately 12 years. These data have changed dramatically, in spite of relatively uniform methods of data collection under the supervision of the same person. These changes have been due to changes in environment, personnel, and medical surveillance rather than technique. The data collected by the author are remarkably similar to those collected by the other companies participating in the study. Since methods of collection are relatively uniform, pooling for the stated purpose is valid.

It is simply amazing to the author that NIOSH would recommend disregarding such a large volume of data on the basis of list of concerns and questions regarding methodology without any further evaluation. There has been no recent lung function data from the American textile industry and it is very important that such data be evaluated carefully and utilized, if possible. Unfortunately, the approach used in the NIOSH review is characteristic of the cavalier, uninformed and unconstructive approach which has characterized NIOSH's involvement with the cotton dust issue.

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1. James A. Merchant, et.al., "An Industrial Study of the Biological Effects of Cotton Dust and Cigarette Smoke Exposure," Journal of Occupational Medicine, Vol. 15, No. 3, (March 1973), pp. 212-221.

2. James A. Merchant, et.al., "Preprocessing Cotton to Prevent Byssinosis," British Journal of Industrial Medicine, 1973, pp. 237-247.

Mr. **Gore**. Thank you, Dr. Imbus, and I certainly want to reassure you, if you have any concern about the subcommittee being both fair and thorough, we intend to be both fair and thorough. That is the reason why we have invited a wide range of viewpoints to be represented on this panel.

I have a number of questions about your testimony, but I would like to withhold them until we have heard from the entire panel, and we will hear now from Prof. James Merchant at the College of Medicine, University of Iowa.

Dr. Merchant, your testimony will also be put into the record in full. If you care to summarize any portions of it, please do so.

Dr. **Merchant**. Thank you, Mr. Chairman.

My name is Dr. James A. Merchant. I am a professor at the University of Iowa in the department of preventive medicine and environmental health.

It is a pleasure to be asked to testify before this subcommittee regarding the state of knowledge of byssinosis, commonly referred to as brown lung disease.

It has been my privilege to conduct a number of research investigations on cotton dust beginning in 1968 and continuing until present. I have been asked to describe my own research, to comment on studies conducted in the textile industry by the American Textile Manufacturers Institute, to comment on prospective studies conducted by Dr. Gerald Beck and colleagues at Yale University, and finally to comment on the National Academy of Sciences and World Health Organization reports on byssinosis.

Because of the limitation of time, I will confine my testimony only to major points, and I will summarize extensively.

The studies with which I began in 1968 in North Carolina, together with Duke University and the North Carolina State Board of Health, in cooperation with Burlington Industries involved a large cross-sectional study. This study was important in that it confirmed the role of cigarette smoking and cotton dust on causing chronic bronchitis and byssinosis. This has been reported previously by other authors, and this larger study confirmed that fact.

We also found a dose-response relationship for cotton dust in preparation and yarn areas and an independent dose-response relationship in slashing and weaving areas. This data, together with other dose-response data collected in Great Britain and elsewhere in the world, was used by the Department of Labor as a basis for setting the Department of Labor cotton dust standard.

Later investigations with which I was involved including a mortality study done when I was associated with NIOSH. We found no overall increase in respiratory mortality in that study; however, we did find a mortality experience which was greater than one would expect for a healthy working population. We also found a significant increase in respiratory mortality with duration of exposure.

Finally, I participated in the design and analysis of five large cross-sectional studies of cotton dust exposure in the ginning industry, the cotton compress and warehouse industry, the cottonseed oil industry, cotton waste utilization industry, and among cotton classers. Results of these studies have recently been completed and submitted to the Department of Labor by NIOSH.

Adverse health effects associated with cotton dust exposure were found among ginners, among cottonseed oil workers, and among those working with waste cotton. Recommendations for dust control, medical surveillance, and work practices have been made to the Department of Labor based on those cross-sectional studies and an assessment of the medical literature.

The American Textile Manufacturers Institute has conducted or supported a number of research investigations on cotton dust beginning in 1969. I will comment only briefly on the two more recent investigations which have been submitted by the ATMI to the Department of Labor.

The first was a postal questionnaire sent to 142-member companies employing a total of 400,000 workers. Somewhat more than half of these workers, or about 150,000, had participated in medical surveillance programs mandated by the cotton dust standard.

This survey found 2.4 percent of the 150,000 employees displaying an FEV1 below 60 percent of predicted. Of these, only 0.4 percent were diagnosed by chest specialists as having byssinosis with lung impairment. The ATMI concluded that this is an indication of the magnitude of the respiratory disease problem in the textile industry and is therefore really quite small.

This approach ignores a number of observations that have been made many times in the literature. The first is that the ATMI has picked a level of lung function which is used by the Department of Labor as its pulmonary function definition of total disability in coal miners, so they picked the tail end of the curve.

Second, the finding of 2.4 percent with an FEV1 60 percent of predicted or lower is only slightly lower than our findings in our cross-sectional survey in 1970 and 1971. Yet, we found rather substantial prevalence of byssinosis, most of these individuals having lung function better than 60 percent of predicted.

The formula used by the ATMI also ignores other significant cotton dust-associated findings such as bronchitis and decline in lung function over a work shift.

Third, the independent chest specialists commented only on classical byssinosis. Again, it is known that cotton dust contributes significantly to the etiology of chronic bronchitis and nonspecific respiratory disease among cotton textile workers, which may not manifest as classical byssinosis.

For these and other reasons, the figures put forward by the ATMI are likely to be a gross underrepresentation of those with respiratory disease associated with cotton dust exposure.

The ATMI has more recently submitted a report entitled "Medical Surveillance Data in the Cotton Textile Industry" prepared by Dr. Imbus. This is a somewhat more detailed study based upon medical surveillance data collected by seven progressive companies, and therefore selected companies and not necessarily representative of the industry as a whole. This was pointed out by the ATMI in their submission, however.

The initial sentence of the report indicates that many changes have occurred in the cotton textile industry during the 10 years preceding the establishment of the cotton dust standard, and this I believe to be the case. I think the textile industry has made remarkable strides in terms of dust control and medical surveillance and has probably done a better job in that regard than any industry in the United States that I am aware of.

The results of this active surveillance process, which has included preemployment examinations, however, has had the effect of producing a highly selected work force. Dr. Imbus recognizes this bias in his report. As a result, no comparison can be made between data collected now and studies conducted in the early 1970's, prior to the implementation of these surveillance programs and dust control.

Unfortunately, very few details are given as to the methodology employed in the construction of the tabular material of this report. This is obviously very important in meaningful interpretation of the data. I believe that well-documented data of this type is relevant to assessment of acute changes in lung function and to acute respiratory symptoms. Because of the systematic selection bias introduced as a result of the surveillance process, however, no meaningful assessment of chronic respiratory symptoms or changes in lung function can be drawn from this type of data relevent to the natural history of byssinosis dealing with chronic respiratory changes, and on that point Dr. Imbus and I agree.

The overall prevalence of byssinosis and acute changes in lung function reported by Dr. Imbus are quite small. As a result, the author suggests medical surveillance, together with dust control at a level of 500 micrograms, should be satisfactory to prevent respiratory disease among cotton textile workers.

Without further information on this study population, it is difficult to draw any conclusion as to whether this apparent effect is principally because of dust control or because of medical surveillance. It is likely that both played a meaningful role. It is also likely that the use of preemployment examinations and selective hiring played an important role in producing a more fit work force. How widespread this practice is and what effect it may have had on a work force is a subject of some importance. Therein lie a number of ethical and legal issues which should not be ignored in the setting of health standards.

In order that this data be adequately analyzed, it would be useful if the raw data could be provided by the ATMI to the Department of Labor for review by independent parties.

I have been asked to comment upon a series of studies conducted for the Department of Labor by Dr. Gerald Beck and colleagues at Yale University. These studies were initiated in 1973 by the late Arend Bouhuys, then the foremost investigator on byssinosis.

The initial cross-section report indicated that textile workers of both sexes, irrespective of age, had excess respiratory symptoms and increased declines in lung function compared to controls. This, however, was not found among cloth room workers or others employed in dust-free jobs.

Based on a rather conservative definition of pulmonary impairment, Bouhuys and colleagues suggested that as many as 35,000 men and women in the United States may suffer from disabling lung function loss owing to chronic lung disease as a result of their work in cotton textile mills.

In 1979, a followup study of this original cohort was undertaken for the Department of Labor by Beck and colleagues. Their results confirmed the findings of the original cross-sectional study, finding that increased symptoms, increased rates of decline in lung function, were found in individuals over a 6-year period; that there was an increased rate of decline among those who retired from cotton textile work, suggesting and indicating that this process is not reversible, as some have previously suggested.

They also explored the role of cigarette smoking and cotton dust and found that these effects were additive and that they were often equally important. There was also some evidence that they may be affecting different segments of the airway and producing airways obstruction.

Rarely has a study been criticized so much by so few. On occasion, the results of this study have been misrepresented by its critics in an effort to discredit it. More frequently, they have rejected the study as being methodologically flawed and therefore not worthy of serious consideration. This was the approach of the National Research Council report on byssinosis.

Recently, the ATMI has sought to review the report from Epidemiology Resources, Inc. Dr. Rothman and his colleagues at Epidemiology Resources, Inc., agreed that the study was flawed and found that meaningful quantitative interpretion of the actual or relative risks from occupational exposure to cotton dust is not possible.

They conveniently state their reservations about the study under eight headings, which I will not go into. I think, of the eight points, one point is worthy of comment because I think it does offer some potential bias in this report. This was their second point. This was the biases introduced, or possibly introduced, from expanding the cohort. Apparently, no clear denominator data was collected when the cohort was expanded. This is a methodological weakness in this study and does allow potential uncontrolled bias in terms of worker participation. There were, however, criteria for inclusion in the study, and the investigators report to me that all reasonable means were made to contact individuals meeting these criteria and living within a 25-mile radius of the study site.

Epidemiology Resources criticizes the use of the word "word of mouth" as a means of recruiting those who met the study criteria. Epidemiologists commonly use any means available to them to identify members of cohorts, including word of mouth. Although the investigators' impression is that they contacted a high proportion of those locally available, even finding some previously missed in the initial cohort, the proportion cannot be defined. This allows the possibility of selection bias. However, the internal consistency of the data in regard to lung function changes by work area would suggest any bias is not great. In addition, their findings are quite consistent with other cross-sectional and prospective studies of cotton textile workers.

I comment point-by-point on the criticisms raised by Epidemiology Resources, Inc. I think, in a number of instances, they have even failed to cite important published papers by the Yale authors which directly address points of criticism that they level at this report.

In conclusion, the criticisms that Epidemiology Resources raised in regard to the Yale investigation, for all the reasons reviewed here, have not convinced this reviewer that their condemnation of this research is justified. Consistent with this view is the bulk of the epidemiological literature on cotton dust exposure and the reviews of the editors and peers who have accepted the several journal articles which have arisen from this unique and important study.

I have been asked to comment on the National Research Council report on byssinosis. This report was issued in February of this year and consisted of both a majority and minority report. Dr. Kleinerman, who was chairman of that committee that produced this report, will no doubt review its findings in detail; hence, my comments will be brief.

The National Research Council, and Dr. Kleinerman in particular, are to be commended for assuring the differing views on many of the clinical and epidemiological issues were addressed in this report. I, together with Prof. Richard Schilling of the British Medical Research Council, Dr. Gerald Beck and Dr. Neil Schachter of Yale University, and Dr. David Wegman of Harvard University, have criticized this report and have associated ourselves with the minority opinion written by Dr. Kaye Kilburn, who was a member of that committee. We criticized the report on two counts.

One is in regard to the definition of byssinosis used by the report. They basically said that this is an acute disease and were unwilling to conclude that byssinosis had a chronic phase. We feel this flies in the face of the medical literature and took issue with that. This is not an academic issue; it certainly has implications in terms of research, clinical care, and assessment of impaired and disabled workers.

The second issue has to do with whether cotton dust causes chronic lung disease. Again, we feel that the epidemiological data on this point are quite solid and, for those reasons, we disagree with the Academy's position. We feel that this has been accepted in the medical literature for good reason for a number of years, and we see really no evidence for the position that the Academy takes.

Again, this point is of some social significance. It is of particular significance for those older cotton textile workers who have been exposed to high cotton dust levels for many years in the cotton textile industry and who now have chronic obstructive lung disease.

Therefore, I would take issue with Dr. Imbus, who says that the Yale investigation is not relevant. We still have several thousand of these cotton textile workers who have worked in the industry, some of whom are still employed in the industry, many of whom are retired, and the issue of compensation of these individuals is, I maintain, still a very real and relevant issue.

In contrast to the National Research Council report on byssinosis, there was a report issued by the World Health Organization entitled, "Environmental Health Criteria on Vegetable Dusts; Dusts Causing Byssinosis." A copy of that is attached to my testimony, based upon a WHO task group meeting in 1979 and 1980.

This group found that chronic respiratory disease does indeed arise from exposure to cotton, flax, and hemp dust. This conclusion is based upon both mortality and morbidity studies which, in the opinion of the expert committee, adequately documented the chronic respiratory response among those exposed to these dusts.

In addition, the report reviews dose-response studies and concludes that the 200-microgram standard promulgated by the U.S. Department of Labor is a reasonable recommendation for cotton dust.

The World Health Organization has gone on to further develop this information for a permissible exposure limit document in their technical report series.

A larger WHO expert committee met in March 1982. Representatives to that committee included a number of investigators who had spent their professional lifetime studying the effects of these vegetable dusts. All were representatives from WHO, ILO, government, or universities. As a group, they constituted a committee with substantial experience and a broad international representation.

This permissible exposure limit report is now in press. It is being translated into several languages and will be published in the very near future. The conclusions of that report are consistent with the conclusions of the previously discussed health criteria document. Recommendations for permissible exposure limits, medical surveillance, and work practices have been transmitted to the Department of Labor in response to its ANPR.

Finally, I believe it is always appropriate to review regulations in light of experience and upon availability of relevant new research. In the case of the cotton dust standard, we now have some experience following implementation of the standard which will be useful in improving the standard. I believe it will be possible to improve some of the administrative aspects of this standard without compromising worker health. I am not sure we have adequate information to fully evaluate dust levels and medical surveillance, but again, I think we need to look at the data that Dr. Imbus and others in industry can provide us on that issue.

Recent research on cotton dust exposure in the knitting industry and the NIOSH cross-sectional studies in other cotton dust exposure sectors should be carefully considered by OSHA. I believe careful consideration and thorough discussion, based upon all of the available data, should result in a standard which provides maximum protection for the worker while minimizing costs to the employer. Mr. Chairman, I will be pleased to answer any questions you or other members of the subcommittee may have.

[The prepared statement of Dr. Merchant follows:]

TESTIMONY BEFORE THE INVESTIGATIONS AND OVERSIGHT SUBCOMMITTEE

Committee on Science and Technology

U.S. House of Representatives

September 22, 1982

My name is Dr. James A. Merchant. I am a professor at the University of Iowa in the Department of Preventive Medicine and Environmental Health. It's a pleasure to be asked to testify before this subcommittee regarding the state of knowledge on byssinosis, or brown lung disease. It has been my privilege to conduct a number of research investigations on cotton dust beginning in 1968 and continuing until the present. Copies of papers I have outlined including two recent reviews are attached. I have been asked to describe my own research, to comment on studies conducted in the textile industry by the American Textile Manufacturer's Institute, to comment on prospective studies conducted by Dr. Gerald Beck and colleagues at Yale University, and finally to comment on the National Academy of Sciences and World Health Organization reports on byssinosis. Because of the limitation of time I will confine my testimony only to major points. The attached papers address a number of these issues in more detail.

Studies of cotton textile exposure with which I have been associated began in 1968 when I was an officer in the U.S. Public Health Service attached to the North Carolina State Board of Health. Together with Duke University, a cross-sectional study was conducted of a cotton blend mill in Gastonia, North Carolina. Analysis of that data showed that smoking and cotton dust contributed to both byssinosis and chronic bronchitis prevalence in that mill. We also observed that total dust was not a reliable indicator of risk and recommended that a respirable dust sampler be developed. In 1970 and 1971, the North Carolina

State Board of Health and the Duke University Division of Environmental Medicine collaborated, with the cooperation of Burlington Industries, to conduct an eight mill cross-sectional study of textile workers. A vertical elutriator cotton dust sampler was developed at this time and was utilized in that study as a method for assessing dust exposure. Just under 3,000 workers were studied in cotton mills, in cotton-synthetic and in synthetic and wool mills, which served as controls. The importance of both cotton dust exposure and cigarette smoking on the prevalence and severity of byssinosis and bronchitis was confirmed. Independent, linear dose-response relationships were found among those working in preparation and yarn areas and among those working in slashing and weaving areas. The dose-response relationships for byssinosis compared favorably with data collected previously in Great Britain by Molyenux and colleagues. Over 11% of cotton textile workers in preparation and yarn areas were found to have some grade of byssinosis at 200 micrograms of cotton dust exposure. These dose-response observations have been used, together with other dose-response observations principally from Great Britain, as the basis for setting the Department of Labor cotton dust standard. In addition, we observed that there was a dose-response relationship between acute decline in lung function over the Monday work shift and dust level, that there was a dose-related decline in pre-exposure ventilatory function, and that cigarette smoking and cotton dust were additive in producing pre-shift declines in lung function. The weight of each of these risk factors appeared to be similar. Other studies conducted at Duke between 1970 and 1973 included a number of model cardroom studies of panels of cotton textile workers which described in detail the physiological responses to cotton dust, the effect of steaming and washing cotton and the effect of a number of other treatments on cotton. As result of these studies, a steaming intervention trial was undertaken with the cooperation of Burlington

Industries. Although it appeared that cotton could be successfully steamed, the biologically active agents were not satisfactorily removed to eliminate the risk from byssinosis, bronchitis and non-specific lung function changes in this study. It was concluded that this type of steaming could not be recommended, but that further efforts to wash cotton should continue. While with NIOSH, I helped develop the cotton washing studies still underway at the USDA at Clemson, South Carolina.

Later investigations, while I served as the Director of the Division of Respiratory Disease Studies for NIOSH, have included an assessment of mortality in two cotton textile mills. Although the overall mortality experienced by that cohort was greater than one would expect for a healthy working population, there was no overall increase in respiratory mortality. There was, however, a significant increase in cardiovascular mortality and there was a doubling in respiratory mortality with duration of exposure. Finally, I participated in the design and analysis of five large cross-sectional studies of cotton dust exposure in the ginning industry, the cotton compress/warehouse industry, the cottonseed oil industry, the cotton waste utilization industry, and of cotton classers. Results of these studies have recently been completed and submitted to the Department of Labor by NIOSH. Adverse health effects associated with cotton dust exposure were found among ginners, among cottonseed oil workers and among those working with waste cotton. Recommendations for dust control, medical surveillance and work practices have been made to the Department of Labor based on those cross-sectional studies and an assessment of the medical literature.

The American Textile Manufacturer's Institute has conducted, or has supported, a number of research investigations on cotton dust beginning in

1969. At that time the ATMI contracted with the Industrial Health Foundation of Pittsburgh to conduct a study of a random sample of cardroom workers in cotton textile mills. That study was completed under the direction of Dr. Dan Braun, based upon a sampling frame designed by Dr. Phil Enterline of the University of Pittsburg, School of Public Health. The results of that study clearly showed that byssinosis was prevalent in cotton cardrooms and that there was objective evidence of physiological response, as judged by decline in lung function over a work shift, in a substantial proportion of cardroom workers. Fine dust was measured by the IHF team and these results together with byssinosis prevalence and decline in lung function over a work shift were reported in their technical report. Although this was not reported by ATMI at the subsequent cotton dust hearing before the Department of Labor, this study clearly showed a very strong linear dose-response relationship for both byssinosis and decline in lung function over a work shift with fine dust. These results were similar to those in Great Britain and to our studies here in the United States. However, since this study confined itself to cardroom worker exposures, lower dust concentrations in spinning, winding, twisting and exposures in slashing and weaving were not considered. As a result, no inferences could be drawn from this study beyond those employed in the carding areas.

A second study sponsored by the American Textile Manufacturer's Institute was undertaken by Dr. Hans Weill and his colleagues at Tulane University. This study included three textile mills, one of which had substantial cotton dust exposure, but two others which had relatively little cotton dust exposure. Both byssinosis and acute declines in lung function were documented in this study. Prominent attention was given by the investigators to the finding of a so called "mill factor or effect". This data was subsequentially reanalyzed by Dr. John Peters, then of Harvard University. It was pointed out by Dr. Peters that the mill effect was principally due to the rather heavy dust exposure in the one mill as opposed to the other mills with lighter dust exposure, and that when the data were ordered in a different fashion it was consistent with a linear dose-response relationship between fine dust and byssinosis prevalence.

A third study was prepared for the ATMI by M.D. Keller and R. R. Lanese of Ohio State University in in 1976. They submitted a "Report to the American Textile Manufacturer's Institute, Inc. Regarding the Analysis of Data Obtained from the Sponsor Concerning Byssinosis Among Textile Workers." The motive for this study was apparently to attempt to reanalyze data from the same mills studied by me and my colleagues at Duke in 1970 and 1971. I was unaware until recently that this study had been done, as the ATMI did not present any of the observations or conclusions reported to them by the investigators from Ohio State University at the Department of Labor Cotton Dust Hearing. Upon review of the report, it is not surprising that the ATMI did not choose to enter this report into the record. After discussion with members of the Medical Subcommittee of the ATMI Safety and Health Committee, it was apparently concluded that for both technical reasons and because it was not "practically appealing from the standpoint of ATMI's position on the dust standard" that this report should not be quoted, distributed or published. Among the findings of this study are that below 200 micrograms there was a prevalence of byssinosis similar to that reported in our papers, that the dose-response relationship was linear in the models employed by these investigators and that the dose-response slope was greater for the intermediate or yarn processing areas as opposed to that for preparation. This too is consistent with our previous findings and at odds with those who maintain that a higher standard should be used for spinning areas as opposed to preparation areas. The authors also concluded that "Merchant's work appears to be the best available in the literature concerning dose-response problems".

A recent ATMI study was a postal questionnaire sent to 142 member companies employing a total of 397,820 workers. Somewhat more than half of these workers, or 151,188, had participated in medical surveillance programs mandated by the Cotton Dust Standard. The results of this study have been submitted to OSHA in response to its ANPR. This survey found that 3,669 (2.4%) of the 151,188 employees displayed an FEV_1 below 60% of predicted. Of this 3,669 workers 3,555 were referred to chest specialists for evaluation and diagnosis. Only 0.4% were diagnosed by chest specialists as having byssinosis with lung impairment. The ATMI concluded that this is an indication that the magnitude of respiratory disease problem in the textile industry is really quite small. This approach ignores a number of observations that have been made many times in the literature. The first is that this level of function is used by the Department of Labor as a pulmonary function definition of total disability for coal miners. Secondly, their finding of 2.4% with a FEV_1 60% of predicted or lower is only slightly lower than our finding in our cross sectional survey in 1970 and 1971. Yet we found a rather substantial prevalence of byssinosis, most of these individuals having lung function better than 60% of predicted. The formula used by the ATMI also ignores other significant cotton dust associated findings such as bronchitis and a decline in lung function over a work shift. Thirdly, the independent chest specialists commented only on classical byssinosis. Again, it is well known that cotton dust contributes significantly to the etiology of chronic bronchitis and non-specific respiratory disease among cotton textile workers which may not manifest as classical byssinosis. For these and other reasons, the figures put forward by the ATMI are likely to be a gross underrepresentation of those with respiratory disease associated with cotton dust exposure.

Finally, ATMI has submitted a report entitled, "Medical Surveillance Date in the Cotton Textile Industry", prepared by Harold R. Imbus, M.D., Sc.D. of Health and Hygiene, Inc. This is a somewhat more detailed study based upon medical surveillance data collected by seven companies. The initial sentence of the report indicates that many changes have occurred in the cotton textile industry during the ten years preceding establishment of the cotton dust standard. Most of the participating companies have had medical surveillance programs underway during that period of time. The result, of this active surveillance process, which has included pre-employment examinations, has had the effect of producing a highly selected work force. Dr. Imbus recognizes this bias in his report. As a result, no comparison can be made between data collected now and studies conducted in the early 1970's prior to the implementation of these surveillance programs and dust control. Unfortunately, very few details are given as to the methodology employed in construction of the tabular material in this report. Details on the methods for collection, how the data was pooled, and details as to statistical analysis are essential to meaninful interpretation of the data. Well documented data of this type is relevant to assessment of acute changes in lung function and to acute respiratory symptoms, such as chest tightness, even though selection effects may also confound acute events; this bias is recognized by the author. Because of the systematic selection bias introduced as a result of this surveillance program, no meaningful assessment of chronic respiratory symptoms or changes in lung function can be drawn from this type of data relevant to the natural history of byssinosis.

The overall prevalence of byssinosis and acute changes in lung function reported by Dr. Imbus were quite small. As a result, the author suggests that medical surveillance, together with dust control at a level of 500 micrograms is satisfactory to prevent respiratory disease among cotton textile workers. Without further information on this study population it is difficult to draw any conclusion as to whether this apparent effect is principally because of dust control or because of medical surveillance. It is likely that both played a meaningful role. It is also likely that the use of pre-employment examinations and selective hiring played an important role in producing a more fit work force. How widespread this practice is and what effect it may have had on the work force is a subject of some importance. Therein lie a number of ethical and legal issues which should not be ignored in the setting of health standards. In order for this data to be adequately analyzed, it would be useful if the raw data could be provided by the ATMI to the Department of Labor for review by independent parties. This unfortunately was not done by the ATMI at the time of the previous Department of Labor Cotton Dust Hearing. At that time, the ATMI submitted a similar analysis of pooled data from several companies. The validity of some of that data was questioned and could not be assessed by OSHA because interpretable raw data was not submitted by the ATMI.

I have been asked to comment upon a series of studies conducted for the Department of Labor by Dr. Gerald Beck and colleagues of Yale University. These studies were initiated in 1973 by the late Dr. Arend Bouhuys, then the foremost investigator on byssinosis. Dr. Bouhuys furthered both our understanding of the physiology of the lung's response to cotton dust and the epidemiology of respiratory disease arising from flax, hemp and cotton dust exposures. He strongly supported adoption of a federal cotton dust standard and favored compensation of cotton textile workers with work-related chronic lung disease. His initial report on a textile community in South Carolina was reported in 1977. This study was unique in that it sought to evaluate both retired and active cotton textile workers, hence eliminating the "healthy worker" effect introduced in studies of active workers. This initial cross-sectional report indicated that textile workers of both sexes, irrespective of age, had excess respiratory symptoms compared to controls. Textile workers in cotton dust exposure areas were also found to have significantly lower lung function than controls. This was not found among cloth room workers and others employed in dust-free jobs. Based on a rather conservative definition of pulmonary impairment, Bouhuys and colleagues suggested that "as many as 35,000 men and women in the U.S. may suffer from disabling lung function loss, owing to chronic lung disease, as a result of their work in cotton textile mills."

In 1979 a follow-up study of this original cohort was undertaken for the Department of Labor by Beck and colleagues. These results have been reported in a number of peer-reviewed papers. Major findings will be reported in November in the Annals of Internal Medicine. Their findings as reported to the Department of Labor in April of 1981 may be summarized as follows:

1. No previous study has longitudinally examined pulmonary function in both active and retired cotton textile workers and controls.
2. Regardless of smoking habit, cotton textile workers had a higher prevalence (18%) and attack rate (12%) of byssinosis compared to controls (less than 1%). Similar patterns were found for other respiratory symptoms.
3. Loss in lung function (FEV_1) over the six year study was greater in male cotton textile workers (252 ml) than male controls (148 ml), and

among female cotton textile workers (183 ml) than female controls (83 ml). These losses are in addition to the previously found (1977) lower FEV_1 (by 403 ml and 197 ml) among male and female cotton textile workers respectively.

4. The prevalence of pulmonary disability, as previously defined by Bouhuys based on pulmonary function testing, was higher among cotton textile workers (22%) than controls (6%) and was 12% among non-smoking cotton textile workers and 0% among non-smoking controls.
5. The relative importance of cotton dust exposure and cigarette smoking was examined. Both were found to be significant risk factors for decreased lung function; their effects were additive and often equally important. There was some evidence that they may be affecting different segments of the airway in producing airways obstruction.
6. Retired cotton textile workers continued to have a higher prevalence of respiratory symptoms and accelerated declines in lung function than controls indicating that lung dysfunction among cotton textile workers is not reversible.

Rarely has a study been criticized so much by so few. On occasion the results of this study have been misrepresented by its critics in an effort to discredit it. More frequently, they have rejected the study as being methodologically "flawed" and therefore not worthy of serious consideration. This was the approach of the NRC Report on Byssinosis. Recently the ATMI has sought a review of the report from Epidemiology Resources, Inc. Dr. Rothman and his colleagues at Epidemiology Resources, Inc. agreed that the study was "flawed" and found that "meaningful quantitative interpretation of the actual or relative risks from occupational exposure to cotton dust is not possible". They conveniently state their reservations about the study under eight headings:

1. Inadequate identification of initial cohort. Epidemiology Resources, Inc. suggest that the Yale investigators studied only 28% of the originally defined cohort. The original Brohuys paper, however, makes clear that 174 of the original 551 were deceased. The Yale investigators cannot reasonably be criticized for not studying the deceased. Of those thought to be available for study, 95% participated.

2. Biases introduced from expanding the cohort. Apparently no clear denominator data was collected when the cohort was expanded - this is a methodological weakness in this study and does allow potential uncontrolled bias in terms of worker participation. There were, however, criteria for inclusion in the study and the investigators report to me that all reasonable means were made to contact individuals meeting those criteria and living within a 25 mile radius of the study site.

Epidemiology Resources, Inc. criticizes the use of "word of mouth" as a means of recruiting those who met the study criteria. Epidemiologists commonly use any means available to them to identify members of cohorts, including word-of-mouth. Although the investigators impression is that they contacted a high proportion of those locally available (even finding some previously missed in the initial cohort), the proportion cannot be defined. This allows the possibility of selection bias. However, the internal consistency of the data in regard to lung function changes by work area would suggest any bias is not great. In addition, their findings are quite consistent with other cross-sectional and prospective studies of cotton textile workers.

3. Incomplete follow-up if textile workers and controls. Ideally, all workers should be followed-up or accounted for in prospective studies. This ideal is rarely achieved. Somewhat under 60% of both cotton textile workers and controls were followed-up. This is less than desirable, but similar to that achieved in other large prospective occupational studies of mobile Americans. Epidemiology Resources, Inc. fails to note that 21.5% of the cotton textile workers as opposed to 11.9% of the controls were too sick to participate or had died at the time of follow-up. They also ignore, and do not reference an important paper from the Yale investigators presented at the International Conference on Byssinosis in 1980 (Chest 79:265-295, 1981) dealing with lung function among retired and deceased cotton textile workers.

4. Failure to use or justify a geographically similar comparison group. In March of 1982, the Yale investigators presented a paper at the ACCP International Occupational Respiratory Disease Conference on HANES (a national probability sample) data obtained from the National Center for Health Statistics. This paper showed that there were no significant regional differences in respiratory symptoms and that respiratory symptoms were significantly greater among cotton textile

workers than the HANES comparison population. Epidemiology Resources, Inc. fail to recognize this presentation or data presented in the Yale Journal of Biology and Medicine (52:191-210, 1979) which does provide justification in the form of similar respiratory symptom prevalence in the three comparision communities.

5. Failure to consider duration of occupational exposure to evaluate possible dose-respone effects. Because of age of entry criteria for this study, the vast majority of cotton textile workers had a least 20 years of textile exposure. Duration of exposure was examined both at the time of the cross-sectional study and at follow-up. No significant duration effect was found. This is consistent with my own cross-sectional study results (Epidemiological Studies Among Cotton Textile Workers, 1970-1973 - Dissertation, University of North Carolina, 1973).

6. Failure to separate the data for controls according to retirment status and failure to analyse the data according to reason for retirement. Again, data relevant to this point was ignored or overlooked by Epidemiology Resources, Inc. (Proceedings of the International Conferences on Byssinosis, Chest 79:26S-29S, 1981). In any event, small numbers of controls over age 65 would limit the usefulness of this point.

7. Lack of identical questionnaires used for textile workers and controls. This involves only two questions, neither of which would in my opinion, would lead to significant differences from those reported. For example, we found a byssinosis prevalence of about 1.5% among our North Carolina comparison population. NIOSH has found similar proportions of comparison workers who report Monday chest tightness.

Application of such findings to the Yale comparison population study would not change any results.

8. Failure to administer pulmonary function tests to workers consistently to avoid acute effects. It is stressed that 35% of workers were tested after 4:00 P.M. suggesting that there may be some acute lung function decline which is interpreted as baseline lung function. This is a reasonable point and may account for some lowering in lung function. This is usually greatest on Monday, however, when only 7% of the workers were tested after 4:00 P.M. Even if there was a "shift effect" during the work week, it is a reflection of the cotton textile worker's lung function for much of his working life. Finally, if this is true, it makes all the more significant the decreased lung function found among retired, compared to active, cotton textile workers.

In conclusion, the criticisms Epidemiology Resources, Inc. leveled at the Yale investigators, for all of the reasons just reviewed, have not convinced this reviewer that their condemnation of this research is justified. Consistent with this view is the bulk of the epidemiological literature on cotton dust exposure and the reviews of the editors and peers who have accepted the several journal articles which have arisen from this unique and important study.

I have been asked to comment on the National Research Council Report on Byssinosis-Clinical and Research Issues. This report was issued in February of this year and consisted of both a majority and minority report. Dr. Klinerman, who was chairman of the committee that produced this report, will no doubt review its findings in detail. Hence, my comments will be brief. The National Research Council and Dr. Klinerman, in particular, are to be commended for assuring that differing views on many of the clinical and epidemiological issues were addressed in this report. I, together with Professor Richard Schilling of the British Medical Research Council, Drs. Gerald Beck and Neil Schachter of Yale University and Dr. David Wegman of Harvard University have criticized this report and have associated ourselves with the minority opinion written by Dr. Kaye Kilburn, who was a member of the NCR Committee on Byssinosis. We criticized the report on two counts. The first, and a seemingly academic criticism is in regard to the definition of byssinosis. The authors suggested byssinosis should be defined only as an acute response to cotton dust and not as a chronic airways disease. This conclusion is not consistent with the medical literature on byssinosis and is potentially harmful because of its future implications for research, clinical care, and assessment of impaired and disabled workers. The second, and a related issue, is in regard to whether chronic pulmonary disease arises from exposure to cotton dust. The authors emphasize studies that fail to show chronic effects and either ignore or attack the more numerous studies which have shown harmful effects. There are numerous cross-sectional studies of cotton dust exposure which indicate a significant chronic effect of cotton dust exposure on lung function. These are reviewed in the papers which I have attached. In addition, every published prospective study has shown a chronic effect of cotton dust exposure as measured by an accelerated loss in lung function in cotton workers over time. These studies include the findings of Beck and colleagues who reported a significantly greater loss in lung function among retired cotton workers compared to controls over a six-year period and the findings of Berry and colleagues who found a significant difference in annual decline in lung function between cotton and synthetic fiber workers over a three-year period. In addition to finding a nearly 70% greater loss in lung function among cotton workers as compared to synthetic fiber workers, Berry reported that workers assigned to the work areas in the carding department had increased rates of decline. This suggests a dose-effect on accelerated loss in lung function. Indeed, in a ten month prospective study conducted by me and Duke colleagues in a North Carolina textile mill, we documented a dose-related decline in lung function over time. For these reasons, we feel there is quite adequate epidemiological evidence showing a causal relationship between cotton dust exposure and chronic pulmonary dysfunction. This was the conclusion of Dr. Kilburn in his minority opinion. The National Research Concil acknowledged that the difference of opinion expressed in its report was of social significance. It is of particular significance for those older cotton textile workers who have been exposed to high dust levels for many years in the cotton textile industry and who now have chronic obstructive lung disease. Fortunately, some states such as North Carolina have developed satisfactory workers' compensation programs for assessment of cotton textile workers with respiratory impairment. However, in other states where compensation programs are not well developed, the effect of this type of report could be to delay just and equitable compensation for these previously heavily exposed and aging cotton textile workers.

In contrast to the National Research Council Report on Byssinosis, is a reported issued by the World Health Organization entitled, "Environmental Health Criteria on Vegetable Dusts; Dusts Causing Byssinosis." Attached find a copy of a report of a WHO task group based on meetings held in July of 1979 and September of 1980. This report has been produced to reflect the findings of the expert committees which met on those occasions. This report recognizes that chronic respiratory disease does arise from exposure to cotton, flax and hemp dust. This conclusion is based upon both mortality and morbidity studies, which in the opinion of the expert committee, adequately documented a chronic respiratory response among those exposed to these dusts. In addition, the report reviews dose-response studies and concludes that the 200 microgram standard promulgated by the United States Department of Labor is a reasonable recommendation for cotton dust.

The World Health Organization has gone on to further develop this information for a Permissable Exposure Limit Document in their Technical Report Series. A larger WHO expert committee met in March of 1982. Representatives to that committee included a number of investigators who had spent their professional lifetime studying the effects of these vegetable dusts. All were representatives from WHO, ILO, government or universities. As a group they constituted a committee with substantial experience and a broad international representation. This Permissable Exposure Limit report is now in press; it is being translated into several languages and should be published in the near future. The conclusions of that report are consistent with the conclusions of the previously discussed health criteria document. Recommendations for permissable exposure limits, medical surveillance and work practices have been transmitted to the Department of Labor in response to its ANPR.

In conclusion, I believe it is always appropriate to review regulations in light of experience and upon availability of relevant new research. In the case of the cotton dust standard, we now have some experience following implementation of this standard which will be useful in improving the standard. I believe it will be possible to improve the administration of this standard without compromising worker health. Recent research on cotton dust exposure in the knitting industry and the NIOSH cross-sectional studies in other cotton dust exposure sectors should be carefully considered by OSHA. I believe that careful consideration, and thorough discussion, based upon all of the available data, should result in a standard which provides maximum protection for the worker while minimizing costs to the employer. Mr. Chairman, I will be pleased to answer any questions you or other members of the subcommittee may have.

Attachments

1. Merchant, J.A. et al. Byssinosis and Chronic Bronchitis Among Cotton Textile Workers. Annals of Internal Medicine. 76:423-433, 1972.

2. Merchant, J.A. et al. An Industrial Study of the Biological Effects of Cotton Dust and Cigarette Smoke Exposure. Journal of Occupational Medicine. 15:212-221, 1973.

3. Merchant, J.A. et al. Dose Response Studies in Cotton Textile Workers. Journal of Occupational Medicine. 15:222-230, 1973.

4. Merchant, J.A. Byssinosis. Chapter 39 in 3rd Edition of Baum's Textbook of Pulmonary Diseases. In press, 1982.

5. Merchant, J.A. Byssinosis. Chapter VII in the NIOSH Report of Occupational Respiratory Diseases. (Merchant, J.A. Ed.) In press, 1982.

6. World Health Organization Task Group on Vegetable Dust. Environmental Health Criteria on Vegetable Dusts; Dusts Causing Byssinosis. OCH/81.1. WHO, Geneva.

Mr. GORE. Let me ask one question here before going to the next witness to resolve a difference—maybe it is not a difference. Let me ask you to clear it up.

Dr. Imbus, you criticized NIOSH for not looking at the raw data in your study, and you said, Dr. Merchant, that the raw data was not provided by ATMI. Did you provide it and they just didn't look at it, Dr. Imbus?

Dr. IMBUS. No, sir. The raw data was not provided in that particular report.

Mr. GORE. But you criticized them for not looking at the raw data.

Dr. IMBUS. I am criticizing them for arbitrarily dismissing the study on the basis of seven concerns which they expressed.

Mr. GORE. No, no, we will come back to that. You specifically criticized them for not looking at the raw data in your statement.

Dr. IMBUS. Could you show me where that is?

Mr. GORE. "This failure to consider the only U.S. data collected," next to last page, "reflective of the cavalier, misinformed, unconstructive approach which has characterized NIOSH's handling of the whole cotton dust issue."

We can come back to this. My only point is, Dr. Merchant said it would be very useful to look at the raw data. You criticized them for not looking at the raw data. Is there any problem with looking at the raw data?

Dr. IMBUS. That, of course, would be up to the ATMI. I prepared a report on——

Mr. GORE. Wait a minute. It wasn't submitted? The raw data was not submitted?

Dr. IMBUS. The raw data was not submitted. There was no intention at that time——

Mr. GORE. Can you provide the raw data?

Dr. IMBUS. That would have to be cleared with the ATMI. I assume that ATMI could do this, but my criticism was that this was a summary of the raw data, and they arbitrarily dismissed it without even asking to look at the raw data or anything else. They just said it just doesn't count.

Mr. GORE. Well, is Mr. Martin here representing the ATMI?

Mr. MARTIN. Yes, sir.

Mr. GORE. Is that OK for NIOSH to see the raw data?

Mr. MARTIN. As far as I am concerned it is, yes, sir.

Mr. GORE. And you can speak for ATMI on that?

Mr. MARTIN. And I am going to testify later, Mr. Chairman, in that regard. I would like to repeat at this time, if I may, that this data was collected as a result of the rules that were written and issued by OSHA that we followed.

Mr. GORE. OK. Well, we will get to that.

Mr. Martin. So as far as I am concerned, they can see it all. We are not scientists in the textile industry.

Mr. GORE. Dr. Imbus, ATMI says it is all right. Can you give it to NIOSH, then?

Dr. IMBUS. They will have to go and get it directly from the plants, which is where the data resides.

Mr. GORE. Do you have the raw data?

Dr. IMBUS. I do not have the raw data?

Mr. GORE. Have you seen the raw data?

Dr. IMBUS. No; I have said in the report that this is——

Mr. GORE. Oh, well, wait a minute. You criticized NIOSH for not looking at the raw data. You mean you haven't looked at it, either?

Dr. IMBUS. There would be no way for me to look at the raw data, which is basically graphs and records. The summary of the data was submitted by each individual medical director of these companies in accordance with certain criteria.

Mr. GORE. Oh, I see. You let the employer summarize the data from his own factory and give you a summary prepared by the employer of data gathered by the employer, and you have not looked at the data.

Dr. IMBUS. Based upon criteria and conferences with the medical directors in these industries.

Mr. GORE. Well, we will certainly need to explore this further in questions, but I am glad that we can get the raw data, and we will discuss that further, because I think it is important to look at the data itself. We will come back to that and have some exchanges on it, Dr. Imbus. I have several other questions.

Dr. Jerome Kleinerman, our third witness, is chairman of the department of pathology at Mount Sinai Medical Center and was the head of the NAS study and handled a very difficult task well as chairman.

Dr. Kleinerman, we want to welcome you here. Without objection, your prepared statement will be put into the record, and we invite you to summarize those portions of it that you think are amenable to that.

Dr. KLEINERMAN. Thank you, Mr. Chairman.

I am Dr. Jerome Kleinerman. I am professor and chairman of the department of pathology at Mount Sinai School of Medicine of the City University of New York.

It was my privilege to serve as chairman of the Committee on Byssinosis of the Division of Medical Sciences of the National Research Council. The report of our committee was published in February 1982.

This committee was constituted to reply to a request of the U.S. Department of Agriculture. The basic objectives of the study were three in general: first, to examine the basic biologic question concerning cotton dust and byssinosis by review of the available information concerning the chemical and physical character of cotton dust and its fractions and the existing knowledge regarding the biologic effects of these materials in man; second, to critique the OSHA recommendations for pulmonary function testing in the field and in medical installations and to evaluate the effectiveness of these test procedures for identifying cases and predicting progress of all types of disease and, further, recommend alternative test procedures which could improve the sensitivity and specificity of case determination and prognostication; third, to develop recommendations that would serve as a guide for future studies in identifying injurious components of cotton dust and mechanisms by which disease is produced.

Toward these goals, Congress directed that up to $100,000 from funds allocated for agricultural research to the Department of Agriculture be expended on the study. Our committee was charged that the highest priority be given to the development of a research agenda which could address the study of the causative agents and mechanisms by which byssinosis develops. The role of pulmonary function testing as a detection and prognostic tool was also to be given consideration.

The committee was constituted to include scientists from several disciplines important in the study of byssinosis. These included four specialists in internal medicine, three of whom were experienced in the study of byssinosis; the fourth was an allergist and clinical immunologist with scientific training and experience in the allergic responses of the human respiratory tract; three experienced human pathologists, all with commitment to the study of respiratory system and occupational lung disease, and all with an interest in how disease processes are initiated, that is, the pathogenesis of respiratory disease; three agricultural scientists interested primarily in the growth, production, determination of particulate size and number, and the biology in general of the cotton plant; a chemist trained in cotton chemisty; and, finally, an immunologist. The committee also called on the expertise of consultants in epidemiology and microbiology as their special advice and guidance were required.

In developing its report, the committee utilized the judgments and consensus of the committee members. The available world literature, through a computerized data base search, was surveyed. An International Conference on Byssinosis in April 1980 was held in conjunction with a meeting of our committee. This convention enabled our committee to share the most current findings on byssinosis and discuss and consult with scientific colleagues interested in this disease.

In order to design the research approaches that appeared most appropriate to develop the information necessary to answer questions about the agent or agents in cotton dust responsible for byssinosis and how the disease develops, it was first necessary to define the disease issues and the specific research questions. Then the committee had to decide which of the significant questions were amenable to research.

We had no problem defining the acute occupational disorder and its relationship to cotton dust exposure. The disease, byssinosis, is recognized by the development of acute respiratory symptoms. These are associated with functional evidence of bronchoconstriction. They occur with workweek periodicity, most often on the first or second workday after an absence from the job.

The acute respiratory symptoms are not specific or unique and come on gradually after hours of exposure to dust. There is an associated decrease in objectively measured respiratory function over the work shift. This commonly returns to normal values after an absence from the workplace exposure. The acute response to cotton dust is unquestionably influenced by the dose of dust to which an individual is exposed and by the specific work task in the manufacturing process.

Cigarette smoking increases the prevalence of acute symptoms associated with cotton dust exposure, and persons with an allergic nature—that is, atopy—with bronchial hyperresponsiveness likewise carry an increased risk of developing byssinosis. Increasing the duration of exposure to cotton dust may increase the prevalence of this disease, but the acute airway effects are commonly observed in persons who have not been previously exposed.

The available scientific evidence concerning the development of a chronic respiratory ailment in workers exposed to cotton dust seems clear. The development of a chronic disease state has been recognized from its earliest description in 1705. These chronic effects were rediscovered and reemphasized by Schilling, the British physician who rekindled interest in byssinosis in 1956.

A chronic disease state of the lungs in workers exposed to cotton dust takes the form of a chronic airways disorder, commonly called chronic bronchitis or bronchiolitis. The evidence that exposure to cotton dust is the specific cause of this disorder is unclear, because the disease, chronic bronchitis, is associated with a variety of nonspecific irritants including cigarette smoke.

There appears to be no relationship between the presence of the chronic disorder and cumulative cotton dust exposure, average cotton dust exposure and duration of dust exposure. One would expect a close relationship between each of these variables and the chronic disease state if they were interdependent.

Furthermore, workers exposed to cotton dust chronically do not have an increased death rate as compared to appropriate controls. This finding has been verified in Great Britain and Ireland. The committee recommended studies that are aimed at clarifying or confirming the existing data and studies designed to evaluate the dose-response relationship for the chronic disease.

The evidence for a relationship of the acute symptomatic disorder and a chronic disorder is less clear. For many years, it was assumed, quite logically, that the acute syndrome slowly evolved into a chronic irreversible airways obstructive disorder. The committee found that the measured decline in respiratory function in cotton workers is not related to the acute symptoms of byssinosis, to cotton dust concentrations, nor to measurable changes in lung function after exposure to cotton dust in the workplace.

Thus, the relationship between the chronic changes and the acute symptoms and acute function changes are not clearly defined. The committee felt that the question of the relationship between the acute symptoms and the chronic respiratory disease requires a special, intensive study.

The committee's report describes a larger number of significant and researchable studies. They are generally designed to identify the component or components in cotton dust that cause acute disease and define the mechanism of their action. Should these studies produce the results that are anticipated, there is a distinct possibility that the entire problem, both acute and chronic, could be resolved. To date, the results of these recommended studies are not available.

One reflection of the balanced nature of our committee deliberations is the presentation of a minority report by one member of our committee. One item addressed in this report indicates that the usefulness of a prospective study done at this time when dust levels in cotton mills have already been significantly reduced may not show the relationship of acute and chronic alterations associated with cotton dust exposure and would be costly. After review and analysis of the content of the minority expression, the committee agreed unanimously to maintain support of the original report.

Since the release of our report, several additional pieces of information have become available. First is the report of a workshop on research in byssinosis published in the American Review of Respiratory Disease in August 1982. The participants included were: Dr. W. K. Morgan, a former director of the Appalachian Laboratory for Occupational Respiratory Disease in Morgantown; Dr. J. B. L. Geeh of Yale; Dr. W. F. Willoughby of Johns Hopkins Medical School; and others.

In this document, entitled "Pulmonary Perspective—Byssinosis: Some Unanswered Questions," the following statements appear:

> Moreover, there appears to be little relationship between the acute symptoms of chest tightness and shortness of breath with the chronic syndrome characterized by bronchitis and possibly by persistent dyspnea on effort. The long-term effects of exposure to cotton, hemp, or flax dust remain largely a matter of conjecture. For many years—

The quotation goes on:

> It had been assumed that the acute syndrome slowly evolved into a condition characterized by irreversible airways obstruction and that it was indistinguishable from emphysema.
>
> Recent work by Pratt and Rooke had cast doubt on this assumption, and it seems that the presence of emphysema postmortem is far better related to cigarette smoking than it is to the exposure to cotton dust. Nonsmoking cotton workers have not been shown to have more emphysema than a comparable group of nonsmokers from other industries. However, bronchitis and bronchiolitis appear to be more common in cotton mill workers than in any control population.
>
> The absence of a more complete understanding, especially in regard to the long-term consequences of exposure to cotton dust, makes it difficult to suggest measures for the prevention and control of byssinosis and its associated syndromes.

Another study by Elwood and coauthors on byssinosis in North Ireland is reported in a recent publication of the Lancet, May 15, 1982. It states, "Flax dust seems to have an acute reversible and specific effect on the respiratory system of all exposed persons," and suggests that this effect is, "greater or more noticeable in workers whose respiratory tract is irritated or whose lung function is impaired by conditions such as chronic bronchitis."

This view explains the close association between the occurrence of byssinosis and chronic bronchitis in the same subject and yet explains the lack of correlation between occupational dust levels and the presence of the chronic disease in byssinosis.

These scientists, Elwood and his associates, studied the mortality statistics in 2,528 flax workers, originally seen in 1961 and 1962. Five hundred two had died between the period of 1961 and 1978. There was no evidence that exposure to flax dust over this period produced any excess mortality attributable to respiratory disease in this cohort of workers representing 82 percent of the total work force between the ages of 35 and 60, and over a followup period of over 16 years. No other specific long-term occupational hazard was observed.

Elwood concludes, "We know of no occupational respiratory disease which causes serious long-term morbidity in a high proportion of exposed workers and yet produces no excess mortality."

Mr. Chairman, our knowledge of this dreadful disease which robs workers of their respiratory health is incomplete. Without information from well-designed longitudinal studies of workers exposed to cotton dust, our views on the risk of the occurrence of long-term disability and death are little more than guesswork at this time.

Almost 20 years ago, Schilling, who rediscovered byssinosis in our modern era, commented on the price we must pay for our lack of understanding of this disease. Schilling said, quoting the Old Testament, Hosea, chapter 4, verse 6, "Thy people are destroyed for lack of knowledge." The need for scientific solutions to this disease remains as urgent today as it was then.

[The prepared statement of Dr. Kleinerman follows:]

Testimony by Dr. Jerome Kleinerman
Before the Subcommittee on Investigation and Oversight
of the House Committee on Science and Technology
September 22, 1982

Mr. Chairman, and members of the subcommittee, I am Dr. Jerome Kleinerman, Professor and Chairman of the Department of Pathology, of the Mt. Sinai School of Medicine of City University of New York in New York City. I have submitted my biographical material for the record.

It was my privilege to serve as chairman of the Committee on Byssinosis, of the Division of Medical Sciences, National Research Council. The report of our committee was published in February of 1982. This committee was constituted to reply to a request of the U.S. Department of Agriculture. The study objectives were three, in general: firstly, to examine the basic biologic questions concerning cotton dust and byssinosis by review of available information concerning the chemical and physical character of cotton dust and its fractions, and the existing knowledge regarding the biologic effects of these materials in man. Secondly, to critique the OSHA recommendations for pulmonary function testing in the field and in medical installations and to evaluate the effectiveness of these test procedures for identifying cases and predicting progress of all types of the disease, and to recommend alternative test procedures that could improve the sensitivity and specificity of case determination and prognostication outcome. Thirdly, to develop recommendations that would serve as a guide for future studies in identifying injurious components of cotton dust and the mechanisms by which disease is produced. Towards these goals, the Congress directed that up to $100,000 from funds allocated for agricultural research to the Department of Agriculture be expended on the study. Our committee was charged that the highest priority be given to development of a research agenda which would address the study of the causative agents and mechanism by which byssinosis develops. The role of pulmonary function testing as a detection and prognostic tool was also to be given consideration.

The committee was constituted to include scientists from several disciplines important in the study of byssinosis. These included four specialists in internal medicine, three of whom were experienced in the study of byssinosis; the fourth was an allergist and clinical immunologist with scientific training and experience in allergic responses of the human respiratory tract; three experienced human pathologists, all with commitment to the study of the respiratory system and occupational lung disease, and all with an interest in how disease processes are initiated, that is, the pathogenesis of respiratory diseases; three agricultural scientists interested primarily in the growth, production, determination of particulate size and number, and the biology in general of the cotton plant; a chemist trained in cotton chemistry; and finally, an immunologist. The committee also called on the expertise of consultants in epidemiology and microbiology as their special advice and guidance were required.

In developing its report, the committee utilized the judgments and consensus of the committee members. The available world literature, through a computerized data base search, was surveyed. An International Conference on Byssinosis in April 1983 was held in conjunction with a meeting of our committee. This convention enabled our committee to share the most current findings on byssinosis and discuss and consult with scientific colleagues interested in this disease.

In order to design the research approaches that appear most appropriate to develop the information necessary to answer questions about the agent or agents in cotton dust that are responsible for byssinosis and how the disorder develops, it was first necessary to define the disease issues and the specific research questions. Then the committee had to decide which of the significant questions were amenable to research.

We had no problem defining the acute occupational disorder and its relationship to cotton dust exposure. The disease, byssinosis, is recognized by the development of acute respiratory symptoms. These are associated with functional evidence of bronchoconstriction. They occur with work-week periodicity, most often on the first or second work day after an absence from the job. The acute respiratory symptoms are not specific or unique and come on gradually after hours of exposure to dust. There is an associated decrease in objectively measured respiratory function over the work shift. This commonly returns to normal values after an absence from the work-place exposure. The acute response to cotton dust is unquestionably influenced by the dose of dust to which an individual is exposed and by the specific work task in the manufacturing process. Cigarette smoking increases the prevalence of acute symptoms associated with cotton dust exposure, and persons with an allergic nature (or atopy) with bronchial hyperresponsiveness likewise carry an increased risk of developing byssinosis. Increasing the duration of exposure to cotton dust may increase the prevalence of this disease, but the acute airway effects are commonly observed in persons who have not been previously exposed.

The available scientific evidence concerning the development of a chronic respiratory ailment in workers exposed to cotton dust seems clear. The development of a chronic disease state has been recognized from its earliest description in 1705. These chronic effects were rediscovered and reemphasized by Schilling, the British physician who rekindled interest in byssinosis in 1956. A chronic disease state of the lungs in workers exposed to cotton dust takes the form of a chronic airways disorder (chronic bronchitis and bronchiolitis). The evidence that exposure to cotton dust is the specific cause of this disorder is unclear, because the disease, chronic bronchitis, is associated with a variety of nonspecific irritants including cigarette smoke. There appears to be no relationship between the presence of the chronic disorder and cumulative cotton dust exposure, average dust exposure and duration of dust exposure. One would expect a close relationship between each of these variables and the chronic disease state if they were interdependent. Furthermore, workers exposed to cotton dust chronically do not have an increased death rate (standardized mortality) as compared to appropriate controls. This finding has been verified in Great Britain and Ireland. The committee recommended studies that are aimed at clarifying or confirming the existing data and studies designed to evaluate the dose-response relationship for chronic disease.

The evidence for a relationship of the acute symptomatic disorder and a chronic disorder is less clear. For many years, it was assumed, quite logically, that the acute syndrome slowly evolved into a chronic irreversible airways obstructive disorder. The committee found that the measured decline in respiratory function in cotton workers is not related to the acute symptoms of byssinosis, to cotton dust concentrations, nor to measurable changes in lung function upon exposure to cotton dust in the workplace. Thus, the relationship between the chronic changes and the acute symptoms and acute function changes are not clearly defined. The committee felt that the question of the relationship between acute symptoms and chronic respiratory disease requires a special, intensive study.

The committee's report describes a larger number of significant and researchable studies. They are generally designed to identify the component or components in cotton dust that cause acute disease and define the mechanism of their action. Should these studies produce the results that are anticipated, there is a distinct possibility that the entire problem, both acute and chronic, could be resolved. To date, the results of these recommended studies are not available.

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Another study by Ellwood and coauthors of byssinosis in Northern Ireland reported in a recent publication in Lancet, May 15, 1982, states: "...flax dust seems to have an acute reversible and specific effect on the respiratory system of all exposed persons" and suggest that this effect is "greater or more noticeable in workers whose respiratory tract is irritated or whose lung function is impaired by conditions such as chronic bronchitis." This view explains the close association between the occurrence of byssinosis and chronic bronchitis in the same subject and, yet, explains the lack of correlation between the occupational dust level and the presence of chronic disease in byssinosis. These scientists, Elwood and his associates, studied mortality statistics in 2,528 flax workers, originally seen in 1961 and 1962; 502 had died between the period 1961 and 1978. There was no evidence that exposure to flax dust over this period produced any excess mortality attributable to respiratory disease in this cohort of workers representing 82% of the total work force between the ages of 35 and 60, and over a follow-up period of over 16 years. No other specific long-term occupational hazard was observed. Elwood concludes: "We know of no occupational respiratory disease which causes serious long-term morbidity in a high proportion of exposed workers, and yet produces no excess mortality."

Mr. Chairman and Members of the Subcommittee: Our knowledge of this dreadful disease which robs workers of their respiratory health is incomplete. Without information from well designed longitudinal studies of workers exposed to cotton dust, our views on the risk of the occurrence of long-term disability and death are little more than guesswork at this time. Almost 20 years ago, Schilling, who re-discovered byssinosis in our modern ear, commented on the price we must pay for our lack of understanding of this disease. Schilling said, quoting from the Old Testament, Hosea, Chapter 4, verse 6, "Thy people are destroyed for lack of knowledge." The need for scientific solutions to this disease remains as urgent today as it was then.

Amer. Rev. Respir. Dis. 1982; 126:354-357.

Pulmonary Perspective

Byssinosis: Some Unanswered Questions[1,2]

The term byssinosis was originally applied to the symptom of chest tightness, with or without shortness of breath, which was noted to occur among workers exposed to dust composed of cotton and flax fibers either on Mondays or on returning to work (1). Although most epidemiologic studies have relied on R. S. F. Schilling's modification of the M.R.C. Respiratory Questionnaire, which incorporates specific questions concerning chest tightness (2), it is now realized that exposure to cotton, hemp, and flax dust may induce not only chest tightness, but several other effects including: (*a*) a decline in ventilatory capacity over the first work shift of the week (3, 4), (*b*) an increased prevalence of chronic bronchitis as defined by the presence of cough and sputum and the possibility that such symptoms are associated with an increased rate of decline in the ventilatory capacity (5, 6), and (*c*) an entity usually known as mill fever that usually occurs when the workers first begin working in the mill or when they return after a prolonged absence (7, 8).

With the exception of mill fever, the above conditions are often collectively referred to as byssinosis. There is, however, a substantial body of evidence that suggests these conditions may be distinct entities with different pathogeneses. Although there is some concordance between the acute shift decline in the forced expiratory volume in 1 second (FEV_1) and the presence of chest tightness, in many instances substantial decrements in the FEV_1 are not accompanied by chest tightness or vice versa (4). Moreover, there appears to be little relationship between the acute symptoms of chest tightness and shortness of breath with the chronic syndrome characterized by bronchitis and possibly by persistent dyspnea on effort (5, 9).

The agent or agents responsible for the acute effects have not yet been definitely identified. The most favored candidates are certain chemical constituents of the cotton bract and gram negative endotoxins that are known to contaminate the cotton plant. There is, however, fairly general agreement that cotton fibers per se are not responsible for the acute symptoms.

The acute effect on ventilatory capacity appears to be influenced by a number of factors, and challenge tests with suitable extracts have demonstrated that the decrement in FEV_1 shows significant intersubject variation (10-13). In subjects challenged with extracts of cotton dust, the FEV_1 response takes an appreciable time to develop in contrast to the decrement that develops when histamine or mecholyl challenges are carried out in asthmatic subjects (14). Furthermore, some studies have exposed subjects to cotton extracts for up to four hours, a period that is far in excess of that necessary to demonstrate increased bronchial reactivity in asthmatic subjects, and which would be quite intolerable in the latter type of patient. Because the decrement in FEV_1 requires several hours to develop, the question arises as to whether mechanisms other than smooth muscle contraction are involved, e.g., glandular secretion, hyperemia, cellular mobilization, or a generalized inflammatory response. The decrement in FEV_1 may be prevented by the prior administration of atropine, is reduced to a limited extent by disodium cromoglycate, chlorpheniramine, and enhanced by propranolol (15). As far as the acute response is concerned, many questions remain unanswered. Not least of those are related to the effects of theophylline, corticosteroids, and antihistamines. Ascorbic acid has also been used as a bronchodilator in other situations and diminishes bronchoconstriction induced by cotton dust. It is also known that nonasthmatic responders to bract extract do not demonstrate increased reactivity to aerosolized histamines (14). Although there has been one study that has demonstrated increased IgE responsiveness in cotton exposed subjects (16), there is as yet no convincing available evidence to indicate that atopy is a predisposing factor in the development of byssinosis.

The long-term effects of exposure to cotton, hemp, or flax dust remain largely a matter of conjecture. For many years, it has been assumed that the acute syndrome slowly evolves into a condition characterized by irreversible airways obstruction that is indistinguishable from emphysema. Recent work by Pratt and Rooke has cast doubt on this assumption and it seems that the presence of emphysema post mortem is far better related to cigarette smoking than it is to the exposure to cotton dust (17, 18). Nonsmoking cotton workers have not been shown to have more emphysema than a comparable group of nonsmokers from other industries; however, bronchitis and bronchiolitis appear to be more common in cotton mill workers than in a control population (17, 18).

By the same token, were emphysema a frequent result of occupational exposure to cotton dust, one would expect that the increased incidence of emphysema in textile workers would lead to a decreased life expectancy and an increased SMR for respiratory disease. To date no such effects have been shown (19-22).

(*Received in original form January 29, 1982 and in revised form May 13, 1982*)

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[1] In May 1981, Cotton Incorporated, in collaboration with the Cotton Foundation, sponsored a workshop to discuss ongoing research in different aspects of byssinosis, with particular reference to the cellular mechanisms responsible for the various symptoms caused by cotton dust. The workshop addressed the following issues: (*1*) How can the clinical events observed among workers in cotton mills be translated into cellular reactions, (*2*) How can cellular reactions be used as the basis for the determining of appropriate animal models, (*3*) What evidence exists as to the identity of the causative agent, (*4*) What research priorities are necessary to answer questions (*1*) and (*2*) and to facilitate the identification of the cause or causes of byssinosis?

[2] Requests for reprints should be addressed to: W.K.C. Morgan, M.D., Chest Disease Service, University Hospital, P.O. Box 5339, Postal Stn. A, London, Ontario N6A 5A5 Canada.

The increased prevalence of cough and sputum that occurs in cotton workers is more likely to be a consequence of nonspecific industrial bronchitis, a condition that has been observed in a wide variety of occupations, including coal, asbestos, gold and metal miners, cement manufacturers, and foundry workers (23). There is good evidence to indicate that industrial bronchitis is a nonspecific response to prolonged deposition of particles in conducting airways. This leads to the mucous glands and goblet cells becoming hypertrophic, and hence to the secretion of excess mucus with the result that the subject develops a cough and sputum. Industrial bronchitis is associated with a minor degree of large airways obstruction, but does not lead to emphysema (24). The evidence also suggests that the main particles that are responsible for this condition are somewhat larger than those that lead to the pneumoconioses and are probably between 5 and 10 μ.

Whether the chest tightness and acute decline in FEV_1 over a shift presages the onset of the chronic form of the disease, as manifested by an associated increased annual decline in ventilatory capacity, remains uncertain. While a few long-term studies suggest that cotton workers demonstrate an increased annual decrement in their ventilatory capacity (4, 25) because of possible bias introduced by selection and other factors, additional prospective studies are needed.

The role of histamine or histamine release in the development of respiratory function changes after cotton dust exposure has been extensively studied (26, 27). Histamine release occurs in lung slices following exposure to aqueous extract of cotton bracts (28). Histamine store depletion has been offered as the explanation for the classical Monday symptoms of byssinosis (29). An increase of histamine metabolites has been shown to occur in the urine of subjects exposed to cotton dust, but the site of the histamine release has not been established and further studies are necessary (30). The focus on histamine is largely historical reflecting the available methodology in inflammatory mediator studies. While histamine may play a role, the time course of reaction and the changes in ventilatory capacity are inappropriate and the evidence from the use of histamine antagonists is nonspecific and incomplete. Although different views exist, the weight of the evidence would suggest that histamine release itself cannot explain the acute reaction seen in byssinosis.

While slow-reacting substance of anaphylaxis (SRS-A) has been known for many years, its relation to arachidonic acid (AA) metabolism has only recently become clear (31, 32). AA is the source of prostaglandins via the cyclooxygenase pathway that is inhibited by such nonsteroidal antiinflammatory drugs as indomethacin (32, 33). AA is also the source of a series of powerful mediators of immediate hypersensitivity via the lipoxygenase pathway. Such mediators include the leukotrienes, which in turn include SRS-A. These compounds are powerful chemotactic agents that can mobilize eosinophils and can be derived from a number of cell types including basophils and neutrophils and perhaps mononuclear phagocytes. Additionally, there is increasing evidence of interactive and amplifying effects between both types of products of AA metabolism and also modulation of histamine release from basophils.

SRS-A leukotrienes C and D are derivatives of arachidonic acid release from the cell surfaces of several cell lines, including the polymorphonuclear leukocytes, mononuclear phagocytes, and basophils. They are 200 to 2,000 times more powerful than histamine in contracting parenchymal lung strips and have been shown, moreover, to induce small airways constriction in low concentrations. They are 20 to 50 times more potent than histamine in contracting guinea pig tracheal rings. Furthermore, SRS-A produces sustained contraction. Other agents that may play a role are platelet activating factors (PAF). Alveolar macrophages release PAFs with ionophores and phagocytosis (34). This is another recently characterized mediator with bronchoconstrictor activity. Furthermore, cotton bract materials are chemotactic for rabbit alveolar macrophages (35). Whether these materials are capable of releasing macrophage-derived chemotaxins for polymorphonuclear leukocytes has not been determined.

Much attention needs to be paid to changes in cell populations evoked in the lungs following exposure, not just in regard to the macrophage, lymphocyte, and polymorph populations, but also in regard to eosinophils, mast cells, and platelets. The latter such cells are extremely sensitive target cells of various environmental agents and are important sources of mediators. Because a large part of the byssinosis complex involves physiologic and pharmacologic responses, the study of neuropharmacologic and inflammatory mediators promises to be fruitful.

Normal values now exist for cellular and humoral components in suitable animals and man. The effects of inhalation of cotton material should be studied in the following ways:

1. Cellular responses defining injury mechanisms and implying the presence of certain mediators.
2. Complement component depletion *in vivo* might be examined using an albumin technique although there are some doubts in regard to the feasibility of this approach.
3. Studies of human cells exposed *in vitro* to cotton products. These would include SRS-A, arachidonic acid release, PAF generation, and thromboxanes (TBX 2).

Attempts to identify specific agents in cotton dust should ideally be related to their ability to induce the response seen in byssinotic subjects, but to date the biological activity of such agents has been studied almost exclusively by their behavior in one or more of the myriad existing bioassays.

Much attention has been paid to endotoxin as a possible causative agent (36). This ubiquitous material, which is well known to be associated with cotton plant material and the respirable dust therefrom, induces a plethora of respiratory, pharmacologic, physiologic, and immunologic responses similar to the symptoms and clinical findings in byssinosis. It was felt by a number of participants that a good case can be made for a pathogenic role of endotoxin as it stimulates many effector arms of the inflammatory system. Provocative challenges with both endotoxin and bacterial polysaccharides (LPS) should be carried out to ascertain whether either or both of these agents will induce the symptoms of byssinosis and at concentrations corresponding to those found in cotton dust. It is suggested that both agents should be used for the challenge tests, because endotoxin consists of bacterial LPS plus certain distinctive proteins (Boivin complex) and the site of the activity is uncertain (37).

If results from these studies are found to argue against the role of endotoxins as a major causative agent, then it would be essential to reexamine endotoxin free aqueous extracts for their ability to induce the synthesis or release of smooth muscle contracting reagents. Alveolar macrophages, basophils and mast cells, lymphocytes and neutrophils are all likely sources of such agents. The observation that cotton dust contains both lancinelene and a lectin should be followed up to assess for possible defect effects on mast cells and basophils (38, 39). Difficulties exist in fractionating cotton dust and then testing each fraction isolated by human provocation challenge. Airway smooth muscle contraction assays should be useful, but it will be important to retest putative active fractions using inhalation challenges in human subjects at selective stages during the fractionation process. In attempting to identify a causative agent, preoccupation with a single agent is unwise in view of the possibility of either a multi-component pathogenesis or the enhancement of one agent by another. Similarly, the intricate interrelationships among complicated systems such as the complement, coagulation, and kallikrein cascades, in relation to the neuropharmacological modulation systems affecting each, must be taken into consideration.

It is evident that there remain many unanswered questions in regard to the effects of cotton dust on the lungs. The absence of a more complete understanding, especially in regard to the long-term consequences of exposure to cotton dust, makes it difficult to suggest measures for the prevention and control of byssinosis and its associated syndromes.

In attempting to identify and control the occupational health problems of exposure to cotton dust, there is a need to devise an approach that involves both short and long-term objectives. A strong case can be made for the existence of a water soluble agent (or agents) that causes the production or release of mediators capable of contracting smooth airway muscle. But the possibility exists that byssinosis is mediated by multiple mediators, released by multiple cell types, induced by numerous different cotton dust constituents, and subject to individual variation in "host factors" for disease expression.

Part of the problem in developing appropriate bioassays relates to the uncertainty of how to define byssinosis. It is suggested the term byssinosis should be reserved for the acute ventilatory response. It therefore becomes essential to develop objective diagnostic criteria in man, and as such the development of a suitable animal model would be of great help. Further studies to decide whether the bract is the only carrier of the active component are necessary. Additional attempts should be made to characterize the propensity of cotton dust for stimulating and releasing mediators capable of causing smooth muscle contraction. Such mediators could have a cellular origin, e.g., could be liberated from basophils, mast cells, macrophages, and lymphocytes, or alternatively could occur following activation of complement by a variety of mechanisms involving serotonin, bradykinin, SRS-A, and PAF. Further attempts need to be made to identify and purify the cotton dust constituents from which mediators originate so that it will be possible to determine the concentration of a particular agent or agents in cotton dust necessary for the development of the acute effect. Additional studies using purified products derived from an endotoxin are necessary.

In the clinical and epidemiologic fields a number of unanswered questions remain:

1. Does the acute responder, the subject with a significant shift decline in the FEV_1, go on to develop the chronic condition that is characterized by increased annual decline in ventilatory capacity?

2. What prognostic significance has chest tightness in regard to the long-term decline in ventilatory capacity?

3. What happens to the symptoms and ventilatory capacity of the acute responder when he is moved from his original workplace, for example, the cardroom or the picking room, to another area of the mill where the dust concentration is lower and byssinotic symptoms are either absent or infrequent?

4. What proportion of acute responders or those who profess chest tightness drop out or give up their job? As an extension of this, does atopy or the allergic diathesis predispose to byssinosis as manifested by chest tightness and the acute shift decrement in FEV_1?

5. What is the overall rate of decline in ventilatory capacity in cotton workers and what is the relationship of this decline to cotton dust concentrations, and the type of cotton milled, whether coarse, fine, or blended?

6. Is there a dose response relationship between the cotton dust concentrations in the mills and the acute and chronic effects of cotton dust component? This can only be determined by relating long-term dust measurements to appropriate medical and biological indexes such as the FEV_1. In this context it is advisable to measure not only the respirable dust fraction (0.5 to 6 μ) but also those particles between 6 and 15 μ, because the latter may be deposited in the tracheo-bronchial tree, especially during naso-oral breathing. What happens to the bronchiolitis and bronchitis when exposure to cotton dust is interrupted or ended?

7. Does long continued exposure to cotton dust lead to the development of emphysema?

W.K.C. Morgan
University Hospital
London, Ontario, Canada

Janet Vesterlund
University of Gothenberg
Sweden

R. Burrell
University of West Virginia
Medical School
Morgantown, West Virginia

J.B.L. Gee
Yale University Medical School
New Haven, Connecticut

W.F. Willoughby
Johns Hopkins Medical School
Baltimore, Maryland

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Occupational Health

THE FLAX INDUSTRY IN NORTHERN IRELAND TWENTY YEARS ON

P. C. ELWOOD I. R. MCAULAY
J. H. ELWOOD

*Medical Research Council Epidemiology Unit;
Trinity College, Dublin; and Queen's University, Belfast*

Summary In 1961–62 a survey of respiratory symptoms in 2528 workers in flax mills in Northern Ireland and of dust levels in the mills was conducted. The workers were followed up in 1978, because recent developments suggested that an upturn in the industry was likely. Flax dust has an acute, reversible effect on the respiratory system, and byssinosis is a prescribed disease under the Industrial Injuries Act (1965). However, the follow-up study found no evidence of an effect on survival of either exposure to dust or byssinosis. The number of applications to compensation panels for assessment and certification of byssinosis has increased greatly in Northern Ireland. Although certification is independent of any subsequent common law claim by a worker for compensation on the grounds of disablement consequent on negligence by his employer, it must weigh heavily in such a claim. About 50 common law claims have been settled out of court for large sums in Northern Ireland, and 950 claims are waiting to be heard. The future cost to the industry is estimated to be at least £16 million. Since byssinosis appears not to cause excess mortality, it is unlikely to cause serious long-term morbidity. Although workers should be compensated for disablement due to negligence, in the absence of unequivocal evidence of disablement caused by byssinosis the financial settlements being reached in Northern Ireland seem unreasonable.

INTRODUCTION

IN 1961–62 a survey based on a questionnaire about respiratory symptoms and lung-function tests was conducted in over 2500 workers employed in flax mills in Northern Ireland.[1] The subjects represented over 82% of the workers aged over 35 years in flax-processing and flax-spinning mills. At the same time a survey of dust levels in 147 workrooms in 17 mills was conducted.[4] Certain developments have caused us to look at the flax industry again.

THE IMPORTANCE OF THE INDUSTRY

Flax (*Linum usitatissimum*) has been cultivated for more than 4000 years, and flax lines, nets, and ropes have been found in stone-age and bronze-age dwellings of about 8000 B.C. Since the 13th century flax has been grown and linen woven in Ireland, until the early 19th century entirely on a domestic scale. Since 1830 the use of power-driven machinery has led to the concentration of processing and spinning of flax in mills.

Thus, flax has been a most important source of employment in Northern Ireland. Initially a source of extra income for farmers and a provider of work for wives and children, the processing of flax later became one of the main industries in the province and, apart from farming, the only widely dispersed one. 25 years ago Carter commented that "one family in four throughout Northern Ireland may be regarded as directly or closely connected with the production of Irish linen".[5] By 1961–62 the importance of the flax and linen industry had declined somewhat, but the industry still employed about 35 000 workers. The continuing decline and the use of more productive machinery have reduced the total number employed to about 15 000 in 1981.

DEVELOPMENTS IN THE INDUSTRY

Between 1960 and 1970 the linen industry suffered greatly from competition from synthetic fibres, but the cost of these fibres has recently risen steeply and the rise is likely to continue with the increasing cost of petrochemicals. The flax fibre is light and flexible, highly absorbent, and very strong, and it becomes stronger when wet. It takes a very fine finish and is immensely durable. These qualities and the swing in consumers' preference for natural fibres have acted in favour of linen. In addition, developments in dyeing and printing have increased the range of linen fabrics.

Flax used to be a labour-intensive crop, expensive to grow and to harvest: it had all to be pulled by hand, but this work can now be mechanised. A major cost arose from retting, which is necessary to permit the woody part of the stem to be separated from the fibres. Traditionally, the whole plant was retted by being soaked in water for some weeks: at the peak of production the whole crop in Northern Ireland, from 200 000 acres, was water retted. This process is unpleasant and labour intensive, and the cost of treating the effluent before discharge which would be required nowadays would be very great. Dew retting, widely used elsewhere, is not possible in the generally wet, sunless, and cold climate of Northern Ireland. Chemical treatment of the plant as a substitute for retting is possible, but for technical reasons the available methods have very limited application. However, a new way of retting the flax while it is still standing has been developed; the plant is sprayed with a systemic herbicide and, after a few weeks, the now dry woody tissue may be removed easily without damage to the fibres. This development, which has been studied intensively during the past few years, could lead to the return of flax-growing to Northern Ireland and other parts of Great Britain.

There have been other developments in the industry due mainly to the design of high-speed, more productive machinery. Although these developments are crucial to the future of the industry, increasing speeds can lead to higher dust levels in the working environment. Fortunately, high dust levels appear to be confined to rooms in which new high-speed winding machines operate and in general there has been a reduction in dust levels since 1961–62 (I. R. McAuley and C. Bodel, unpublished).

FLAX DUST AND HEALTH

Respiratory symptoms have long been known to occur in workers handling flax. In 1705 Ramazzini[6] commented on the "foul mischievous powder, that entering the lungs . . . causes continual coughs . . . and cannot but be virulent and open enemies to human nature". Referring to long-term effects he wrote "'tis a sordid profit that's accompany'd with destruction of health". Van Coelsen[7] was probably the first to focus attention on the periodicity of respiratory symptoms in textile-workers. Oliver[8] described symptoms in cotton-workers and was the first to use the term "byssinosis" (from the Greek for flax or linen) for the typical Monday-morning respiratory symptoms. These are tightness of the chest or breathlessness developing shortly after commencing work after the weekend break; at first symptoms are confined to Mondays but later extend further into the working week.[9]

Since these early reports there have been many studies of byssinosis, and the clinical picture in flax-workers and in cotton-workers appears to be identical.[10] Schilling was the first to conduct epidemiological surveys in cotton-workers in Lancashire,[9,11–13] and Pemberton et al.[1–3] investigated flax byssinosis in Northern Ireland using similar methods.

The prevalence of byssinosis is closely related to the dust levels in the environment. In the 1961–62 survey over 50% of workers in dusty pre-preparing occupations had symptoms, whereas the prevalence was much lower in other occupational groups; for example, wet-spinners and polishers did not appear to be at risk.[2] A more detailed quantitative study of dust levels confirmed a relation with the prevalence of byssinosis.[14] However, not only levels of dust are important, but also the type of fibre producing the dust, and in particular the way the flax was retted. Dust from chemically retted flax has a much smaller effect on lung function,[10] and in one study of 41 workers handling chemically retted flax no case of byssinosis was detected.[15] The use of a desiccating method of retting might therefore lead to a substantial reduction in the prevalence of byssinosis.

Pemberton et al., having carefully examined the whole epidemiological picture, pointed out that flax dust seems to have an acute, reversible, specific effect on the respiratory system of all exposed persons, and they suggested that this effect is "greater, or more noticeable in workers whose respiratory tract is irritated or whose lung function is impaired by conditions such as chronic bronchitis". Byssinosis is much more likely to develop in these subjects.[2] Such a view is consistent with the much higher prevalence of byssinosis in smokers than in non-smokers; it also explains the close association between the occurrence of byssinosis and chronic bronchitis in the same subject.[2] Furthermore, in a detailed examination of the inter-relations between dust levels in the working environment and the occurrence of both byssinosis and chronic bronchitis it was found that, whereas byssinosis and dust level were slightly correlated, there was no association between chronic bronchitis and dust level after taking into account the effects of smoking.

This evidence is consistent with the hypothesis that byssinosis is an acute and reversible response to the dust by the respiratory system. Such an effect on exposed workers is important and may be decisive to their continued employment; this is acknowledged by the definition of flax-workers' byssinosis as a prescribed disease under the Industrial Injuries Act (1965). The question of permanent respiratory disability is quite a different issue, however, and if this ultimately does occur it is far more important than any acute, reversible effect.

To test the hypothesis that exposure to flax dust or the occurrence of byssinosis is prejudicial to health and to an extent sufficient to cause an increase in mortality, the 2528 flax-workers seen in the 1961–62 survey were followed up. [illegible] had died between 1961 and 1978. There was no evidence that either exposure to dust of byssinosis had an effect on survival.[16,17] Two similar studies of cotton-workers have been reported. 1496 workers in cotton-mills in South Carolina were followed up for 22 years;[18] no significant excess mortality was detected, and the mortality pattern by cause was no different from that in the general population. Another study of cotton-workers in Lancashire, followed up for 12 years, failed to detect any association between byssinosis and mortality.[19]

This is most important evidence. Almost any hazard to health will have an effect on survival, and this effect will be detected provided numbers are sufficient. The absence of any effect on survival in these textile-workers, once account has been taken of tobacco consumption, is evidence against the occurrence of any serious long-term respiratory impairment. Many studies have shown that both respiratory symptoms and lung function, estimated by forced expiratory volume and forced vital capacity, are sensitive predictors of mortality.[20–23] Most of the evidence relating respiratory impairment to mortality comes from studies of chronic bronchitis; however, it is difficult to envisage any chronic lung disease that is severe enough to cause disability but that does not impair survival. On the other hand, while mortality data might not tell the whole story, they are unbiased and would certainly reflect any significant lung disease.

THE FUTURE

The textile industry is of great importance in England and Wales, where it provides employment to more people than the motor-car industry, but in Northern Ireland it is an even more important source of work. The increasing cost of artificial fibres and the advantages of the natural flax fibre, new methods for growing and harvesting, and more efficient processes at each stage of linen manufacture point towards a possible upturn of this industry in Northern Ireland.

Major problems for the industry arise, however, from certain legal situations. First, byssinosis is a prescribed disease in the United Kingdom but not in Belgium, France, or other flax-growing countries, despite common membership of the European Economic Community, and problems arise as each country attempts to maintain a substantial textile industry together with free movement of finished products into other member states. The table shows the numbers of workers in the flax industry in Northern Ireland who have been certified as suffering from byssinosis by compensation panels in Northern Ireland set up under the Industrial Injuries Act (1965); there has recently been a large increase in the number of applications for assessment. Although certification is quite independent of any claim which a worker may subsequently make under common law for compensation on the grounds of disablement consequent on negligence by his employer, previous certification as byssinotic must weigh heavily in any such claim. The burden to the industry in Northern Ireland from these common law claims is now enormous. By the end of 1981 more than 50 common law claims had been settled. None went the full legal course to decision by a jury; all were settled out of court for substantial sums. 950 claims are currently waiting to be heard, and the estimated minimum financial liability to the linen industry which will arise from common law claims is £16 million.

EXAMINATIONS FOR FLAX BYSSINOSIS BY PNEUMOCONIOSIS MEDICAL PANELS IN NORTHERN IRELAND

Year	No. certified as byssinotic	No. not so certified	No. accepted for assessment*
1966	7	4	..
1967	13	6	..
1968	4	2	..
1969	5	4	..
1970	6	1	..
1971	3	0	..
1972	0	2	..
1973	2	0	..
1974	7	5	..
1975	10	7	..
1976	7	6	..
1977	9	4	..
1978	11	8	19
1979	43	41	86†
1980	98	63	485†

Source: reference 10, supplemented for the years after 1977 by data from the Department of Manpower, Northern Ireland. *No. accepted for assessment not stated in reference 10. †All cases not yet decided.

The medical profession, and occupational health physicians in particular, have heavy responsibilities in these circumstances. First, there is a clear duty to safeguard the health of all persons at risk of byssinosis. More rigorous pre-employment medical examinations for those likely to be exposed to flax dust together with regular check-ups, including tests of lung function, are required. Workers with early signs of byssinosis must be transferred to jobs where they will not be exposed to flax dust. Advice on the additional dangers of tobacco smoking must be given repeatedly. Employers must continue their efforts to reduce dust levels in workplaces.

Secondly, the medical profession has responsibilities in relation to both the certification of workers as byssinotic, and the compensation of disabled workers. Workers should be compensated if negligence on the part of an employer has led to their disablement, but the economic consequences of excessive or unreasonable compensation could lead to the end of employment for thousands of workers. The relevant evidence must be carefully considered against this background.

The most important evidence is that no excess mortality attributable to respiratory conditions has been found in a cohort of workers, representing over 82% of the total work-force aged 35 years or over in this industry in 1961–62, followed up for 16 years. Nor has any specific long-term occupational hazard been found, such as the cancers which occur in asbestos-workers[24] or wood-workers.[25] Although there is very little evidence directly concerning chronic morbidity from byssinosis in flax-workers, we know of no occupational respiratory disease which causes serious long-term morbidity in a high proportion of exposed workers and yet produces no excess mortality.

In the absence of unequivocal evidence of disablement the financial settlements for byssinosis in flax-workers being made in Northern Ireland seem quite unreasonable. If disablement from byssinosis does occur it must be rare, and any comparison which might be made between byssinosis and pneumoconiosis must take account of the evidence on mortality and must attempt to allow for the effects of confounding factors such as tobacco smoking and previous episodes of non-occupational respiratory illness, such as asthma and chronic bronchitis.

In 1963 Carter wrote "In the linen industry, still passing through a transitional stage of adjustment to rapidly changing world conditions, the keynote is confidence concerning its future, rather than nostalgia about its past".[26] This remark remains an apt summary of the industry's circumstances. However, the future of the industry, perhaps even its very survival, probably depends more on medico-legal developments than on all the technical and other issues combined.

Correspondence should be addressed to P. C. E., M.R.C. Epidemiology Unit, 4 Richmond Road, Cardiff CF2 3AS.

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References continued at foot of next column

Medical Education

AN INTEGRATED FINAL M.B. EXAMINATION

WILLIAM ODLING-SMEE A. H. GARY LOVE
W. GEORGE IRWIN JOHN VALLANCE-OWEN
A. DOUGLAS ROY

Departments of Medicine, Surgery, and General Practice, The Queen's University of Belfast

Summary Five years' experience of a qualifying examination that integrates all parts of clinical medicine except midwifery and gynaecology is reported. Physicians and surgeons examine together in the clinical and oral examinations. Examiners who have taken part in this examination believe that it is more effective in testing students' knowledge of basic core medicine than is the traditional type of examination.

INTRODUCTION

IN 1971 the medical curriculum in the Queen's University of Belfast was changed with the object of producing graduates with a wide knowledge of disease, a sound grasp of clinical skills, and an ability to relate to and understand their patients. It soon became apparent that at the end of an integrated course medical and surgical subjects should, logically, be

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DR ELWOOD AND OTHERS: REFERENCES—*continued*

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Mr. GORE. Thank you, doctor.

We will hold questions until our panel has been completed.

Our last witness on this panel is Dr. J. Donald Millar, director of the National Institute for Occupational Safety and Health.

Dr. Millar, we welcome you to the subcommittee. Without objection, your testimony will be put in the record, and we invite you to proceed.

Dr. MILLAR. Thank you, Mr. Chairman.

With me today from the staff of the Institute are Mr. Richard Lemen, Mr. Robert Glenn, Dr. Alan Engleberg, and Dr. Robert Castellan, all of whom I will make available to you for questions if need be.

Among other things, I am certified as a specialist in preventive medicine, and in that context, I would like to begin by sharing with you my views on the prevention of this particular disease. After that I will attempt to address the specific topics you raised in your letter.

Exposure to cotton dust can cause both acute and chronic lung problems, and for over 300 years the acute symptoms of byssinosis have been recognized in cotton workers. Since the development of instruments to measure lung function, we also have learned that these symptoms are commonly accompanied by measurable reduction in lung function. We know that these effects are related to the level of cotton dust to which the workers are exposed. We also know that if a worker is removed from exposure to cotton dust, in the early stages of the disease the acute disorder is reversible.

We recognize that exposure to cotton dust can produce chronic disease marked by cough, phlegm, shortness of breath, and a generalized obstruction of the lung airways that can be measured. These signs and symptoms are generally not reversible and may lead to marked disability and premature death.

While byssinosis can occur in cotton workers who have never smoked, we know that cigarette smoking substantially increases the risk of contracting this disease.

As you have heard already there is no confirmed explanation of the mechanism by which cotton dust causes byssinosis; similarly, the progress of the disease from acute effects to chronic respiratory impairment is not well understood. Nevertheless, these uncertainties need not preclude us from taking effective action to prevent this disease, and it is a disease well worth preventing.

We estimate that nearly 600,000 workers in the United States are currently exposed to cotton dust. In 1977 the Department of Labor estimated that there were 84,000 cases of byssinosis among active textile workers. Other estimates indicate there are 35,000 active and retired textile workers considered totally disabled with severe lung disease.

Indeed in 1980, the Public Health Service adopted a specific objective in its list of health objectives for the year 1990 which relates to this problem, and I would like simply to read the objective: It says, "By 1990, among workers newly exposed after 1985, there should be virtually no new cases of four preventable occupational diseases." It names the four, and they include byssinosis.

What will it take to achieve this lofty objective? I believe that a sound strategy for prevention of this disease is based on three major preventive tactics. The first is to reduce the exposure of workers to cotton dust. We cannot define a precise level of dust above zero that will guarantee that no worker will be affected. Numerous studies, however, have demonstrated a dose-response relationship between the level of cotton dust and the likelihood of illness, and we feel that these studies support our recommendations.

We believe that the most reliable way to reduce the exposure of workers to cotton dust is through engineering to prevent the generation of cotton dust and to increase the efficiency of its removal from the work environment. In 1974 we recommended to OSHA that exposure to cotton dust be limited to the lowest level achievable via engineering controls. At that time we considered the lowest feasible level to be less than 200 micrograms per cubic meter. OSHA incorporated this recommendation into the present cotton dust standard.

We continue to support that recommendation. Indeed, some textile manufacturers have already adopted advanced technology which brings exposures within these recommended limits.

Now, we recognize that lowering cotton dust exposure to this level may not be sufficient to totally eliminate this disease, and until workplace cotton dust exposures are universally brought to below recommended levels by engineering or other control technologies, we think it may be necessary that workers use appropriate respirators as an auxiliary method of protection.

In my view, the use of respirators is an adjunct to, and never a substitute for, engineering controls. However, if respirators are used, they must fit properly, and workers must be trained in their proper use. We support the provisions in the present OSHA standard which relate to the use of respirators.

The second preventive tactic in a strategy of prevention of byssinosis is to periodically monitor the health status of cotton workers. The purpose of this medical monitoring is twofold: first, to insure that all parts of a prevention program are working effectively and that the workers are not developing respiratory disease. The second purpose is to identify any workers who are developing byssinosis so that they can be removed from exposure to cotton dust before they develop irreversible impairment. We continue to recommend these provisions which were incorporated in the cotton dust standard.

The third preventive tactic in an overall strategy for preventing this disease is to encourage cotton workers not to smoke. As I said earlier, we know that exposure to cotton dust can cause significant lung impairment in persons who have never smoked. We also know that cotton workers who smoke are at clearly greater risk than those who do not smoke. A comprehensive prevention strategy demands that this additional risk factor also be addressed.

As regards prevention, sir, I believe that the current cotton dust standard promulgated by OSHA is of great value in assuring that hazardous exposures to cotton dust are reduced. I consider it an important tool in the prevention of occupational lung disease.

Mr. Chairman, this concludes my views on the prevention of byssinosis. Now I would like to turn to your specific questions.

We have reviewed several recent studies of byssinosis, and with the chairman's permission, I will submit copies of our written comments which we provided to OSHA, and will simply, during this hearing, briefly summarize our thoughts.

Earlier this year, we reviewed the paper by Dr. Harold Imbus, already discussed, and our overall conclusion is that while this report is a valuable compilation of data from a particular study population, we do not find sufficient documentation that this population is truly representative of the industry as a whole. In that particular light, we did not consider it appropriate to recommend changing the standard on the basis of that report.

We also reviewed the report "Byssinosis: Clinical and Research Issues" by the National Academy of Sciences. Our major concern about this report is that it casts doubt on the association between exposure to cotton dust and the chronic lung disease seen in cotton workers. While researchers may properly highlight gaps in knowledge and insist on more and better evidence of causative relationships, we in public health cannot afford to withhold preventive action until every uncertainty has been resolved.

Because of its prestige, when the National Academy of Sciences speaks, an important audience listens and is likely to react. When the NAS casts doubt on the role of cotton dust in producing lung disease, even in the context of highlighting gaps in epidemiologic knowledge, some listeners will tend to relax their preventive efforts. This is likely to have ominous implications for the health of cotton workers.

We believe that numerous studies support a relationship between cotton dust and chronic lung disease. Prudent public health practice demands that we act on this evidence, even while researchers continue to fill in gaps in our knowledge.

In March of this year we submitted written comments to OSHA on the advanced notice of proposed rulemaking on the cotton dust standard. We summarized our views as I have attempted to present them here. We are not aware of any new scientific information that warrants a change in the recommendations we made to OSHA before the promulgation of the present standard, and we see no justification at this time for reopening inquiry into the efficacy of the standard.

Mr. Chairman, we are aware of the uncertainties in many aspects of the byssinosis issue. However, we believe that what is required to prevent the disease is a matter of little uncertainty, and we believe that while scientific issues are being debated, it is essential to press on with all the necessary tactics of a sound prevention strategy.

Thank you, Mr. Chairman. I would be happy to respond to your questions.

[The prepared statement of Dr. Millar follows:]

PREPARED STATEMENT OF J. DONALD MILLAR, M.D., DIRECTOR, NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH CENTERS FOR DISEASE CONTROL, PUBLIC HEALTH SERVICE, DEPARTMENT OF HEALTH AND HUMAN SERVICES

Mr. Chairman and members of the Subcommittee:

I am Dr. J. Donald Millar, Director of the National Institute for Occupational Safety and Health (NIOSH), in the Centers for Disease Control of the Department of Health and Human Services. With me today from the staff of the Institute are Mr. Richard Lemen, Director of the Division of Standards Development and Technology Transfer; Mr. Robert Glenn, Acting Director of the Division of Respiratory Disease Studies; and Dr. Alan Engleberg and Dr. Robert Castellan, Medical Officers in the Division of Respiratory Disease Studies. We appreciate this opportunity to discuss byssinosis.

Among other things, I am a certified specialist in preventive medicine. To me the least controversial aspect of byssinosis is the need to prevent it. To begin, I wish to share with you my views on the prevention of this disease. Then I will attempt to address the specific topics raised in your letter of invitation regarding our recent reviews of new studies, and our comments to OSHA on their Advance Notice of Proposed Rulemaking on the cotton dust standard.

Exposure to cotton dust can cause both acute and chronic lung disorders. For almost 300 years the acute symptoms of byssinosis have been recognized in cotton workers. Typically the workers experience shortness of breath and the feeling of a "tight chest" on returning to the job after a weekend or holiday. Since the development of instruments to measure lung function, we know that these symptoms are commonly accompanied by measureable reduction in lung function. Furthermore, we know that these effects are related to the level of cotton dust to which the workers are exposed. We also know that in the early stages of the disease, if the worker is removed from exposure to cotton dust, the acute disorder is reversible, that is, the symptoms subside.

We also recognize that exposure to cotton dust can produce chronic disease marked by cough, phlegm, and shortness of breath, and a generalized obstruction of the lung airways that can be measured. These signs and symptoms are similar to those of chronic bronchitis and emphysema, and are generally not reversible. Indeed, this chronic condition may lead to marked disability and premature death.

While byssinosis can occur in cotton workers who have never smoked, we know that cigarette smoking substantially increases the risk of this disease.

There is no confirmed explanation of the mechanism by which cotton dust causes byssinosis; similarly, the progress of the disease from acute effects to chronic respiratory impairment is not well understood. Nonetheless, these uncertainties need not preclude us from taking effective action to prevent this disease, and it is a disease well worth preventing.

Nearly 600,000 workers are exposed to cotton dust in the United States. In 1977, the Department of Labor estimated that there were 84,000 cases of byssinosis among active textile workers. At about the same time there were an estimated 35,000 active and retired textile workers who were considered totally disabled with severe chronic lung disease.

NIOSHS considers occupational lung disease the number one work-related health problem facing the nation. Byssinosis and the chronic conditions associated with exposure to cotton dust are an important component of this problem. Indeed, the Public Health Service has adopted in its national objectives a specific objective calling for the prevention by 1990 of any new cases of byssinosis due to cotton dust in workers newly exposed after 1985.

What will it take to achieve this objective and eliminate this major occupational health problem? We believe that a sound strategy for prevention is based on three major preventive tactics:

1. Reduce the exposure of workers to cotton dust. Because individual susceptibility to cotton dust varies we cannot define a precise level of dust above zero that will assure that no worker is affected. Numerous studies have demonstrated a dose-response relationship between the level of cotton dust and likelihood of illness which support our environmental recommendations.

We believe that the most reliable way to reduce the exposure of workers to cotton dust is engineering to prevent the generation of cotton dust and to increase the efficiency of the removal of dust from the working environment. In 1974 NIOSH recommended to OSHA that exposure to cotton dust be limited to the lowest level achievable via engineering controls. This recommendation was included in the NIOSH criteria document on cotton dust. At that time we considered the lowest feasible limit to be less than 200 $\mu g/m3$ in yarn production areas of textile mills. OSHA incorporated this recommendation in the present cotton dust standard. We continue to support that recommendation. We recognize that lowering cotton dust exposure to this level may not be sufficient to eradicate the disease completely.

Some textile manufacturers have already adopted advanced technology which brings exposures within the recommended limits.

Until workplace cotton dust exposures are universally brought to their recommended levels, by engineering or other control technology, it may be necessary that workers use appropriate respirators as an auxiliary method of protection. In my view, the use of respirators is an adjunct to, and never a substitute for, engineering controls. However, if respirators are used, they must fit properly, and workers must be trained in their proper use. We support the provisions in the present OSHA standard, as regards the use of respirators.

2. Periodically monitor the health status of cotton workers. In our 1974 criteria document on cotton dust, we urged that employers conduct thorough preplacement medical evaluations of their workers, and subsequent periodic examinations that include, at the minimum: a medical history, simple pulmonary function tests, and maintenance of workers' medical records. The purpose of this medical monitoring is twofold: first, to ensure that all parts of a prevention program are working effectively, and that workers are not developing respiratory disease; secondly, to identify any workers who are developing byssinosis so that they can be removed from exposure to cotton dust

before they develop irreversible impairment of lung function. We continue to recommend these medical monitoring provisions, which were incorporated into the cotton dust standard.

3. Encourage cotton workers not to smoke. We know that exposure to cotton dust can cause significant lung impairment in persons who have never smoked. We also know that cotton workers who smoke are at clearly greater risk. A comprehensive prevention strategy demands that this additional risk factor be addressed.

Finally, I believe that the current cotton dust standard promulgated by OSHA is of great value in assuring that hazardous exposures to cotton dust are reduced. Therefore I consider it an important tool in the prevention of occupational respiratory disease.

Mr. Chairman, this concludes my views on the prevention of byssinosis. I'd like now to attempt to answer the Chairman's request for comments on recent research on byssinosis, and on OSHA's Advanced Notice of Proposed Rulemaking on the cotton dust standard.

In response to requests from OSHA, we reviewed several recent studies of byssinosis. With the Chairman's permission I will submit copies of the written comments we provided OSHA, and this morning will very briefly summarize our thoughts.

Earlier this year, we reviewed the paper "Medical Surveillance Data in the Cotton Textile Industry," reporting a study done by Dr. Harold Imbus for the American Textile Manufacturers Institute (ATMI). Dr. Imbus analyzed medical data concerning 41,173 workers at seven companies, all members of ATMI. His report suggests that the 200 μg/m3 permissible exposure level is unnecessarily stringent. Our overall conclusion is that while this report is a valuable compilation of data from a particular study population, we do not find documentation that this population is representative of the industry as a whole. Indeed the participating companies, having willingly provided the data, might well be those with the most favorable records of dust control and medical surveillance. In this light we did not consider it appropriate to recommend changing the standard on the basis of this report.

At OSHA's request we also reviewed the paper, "Analysis of Pulmonary Function Data of Knitting Industry Workers" reporting a study done by Drs. Boehlecke and Battigelli for Cotton, Incorporated. These investigators analyzed data from twelve knitwear and nine hosiery plants, all of which use the same medical services contractor. This study also is limited in that the way in which subjects were included for study does not assure us that the results are reflective of the knitting industry as a whole.

We recently reviewed a third report "Byssinosis: Clinical and Research Issues": by the National Academy of Sciences (NAS). Our major concern about the NAS report is that it casts doubt on the association between exposure to cotton dust and the chronic lung disease seen in cotton workers. While researchers may properly highlight gaps in knowledge and insist on more and better evidence of causative relationships, we in public health do not have the luxury of witholding preventive action until every uncertainty has been resolved. Because of its prestige, when the National Academy of Sciences speaks, an important audience listens and is likely to react. When the NAS, as it did in this report, casts doubt on the role of cotton dust in producing lung disease, even in the context of doing so to highlight uncertainties in epidemiologic knowledge, some listeners will tend to relax their preventive efforts. This is likely to have ominous implications for the health of cotton workers. Numerous studies support a relationship between cotton dust and chronic lung disease. Prudent public health practice demands that we act on this evidence, even while researchers continue to fill in gaps in our knowledge.

In March of this year we submitted written comments to OSHA on the Advanced Notice of Proposed Rulemaking on the cotton dust standard. We summarized our views, as we have presented them here, about the need for reducing exposures to the lowest feasible limit, and the need for medical monitoring of workers. In summary, we are not aware of any new scientific information that warrants a change in the recommendations we made to OSHA before the promulgation of the present standard, and we see no justification at this time for reopening inquiry into the efficacy of the standard.

Mr. Chairman, I would like to close by saying that we are aware that there are uncertainties in many facets of the byssinosis issue. Certainly, you will be told of them as the hearing progresses today. However, we believe that what is required to prevent the disease is a matter of little uncertainty. And we believe that while the scientific issues are being debated, it is essential to press on with all the necessary components of a sound prevention strategy.

I will be happy to try to answer any questions you or your colleagues may have.

Mr. **Gore**. Thank you very much for a very strong statement, Dr. Millar.

Dr. Kleinerman, how many workers were studied by the NAS panel?

Dr. **Kleinerman**. There were no workers studied. Our review was one of the literature and the compilation of previous studies.

Mr. **Gore**. All right. You did not look at any employees or people suffering from byssinosis.

Dr. **Kleinerman**. No, sir.

Mr. **Gore**. You looked at previously written studies.

Dr. **Kleinerman**. Yes, sir.

Mr. **Gore**. Now, Dr. Imbus, was there any outside review of the data summaries provided to you by the textile companies?

Dr. **Imbus**. No, sir. This data was gotten together quickly for submission by the ATMI to OSHA at OSHA's request. There was no opportunity for outside review.

Mr. **Gore**. What date was it pulled together?

Dr. **Imbus**. It was pulled together over a period of several weeks, last February, in that vicinity; I am not sure of the exact date, sir.

Mr. **Gore**. So there was no opportunity to have it reviewed by anyone other than the textile companies?

Dr. **Imbus**. That is correct, sir.

Mr. **Gore**. Now, the data was collected from only 7 of the 200 member companies of ATMI. Do you know how the seven were selected?

Dr. **Imbus**. The seven were those companies which had had active medical surveillance programs, usually with full-time medical staff, and would, we think, represent the companies that had the more sophisticated data; they had it on computers, and so on. Those were the companies that were in a position to submit data to us.

We recognized that there were a lot of companies out there that could not submit data in a form that would be appropriate.

Mr. **Gore**. Which were the seven companies?

Dr. **Imbus**. I would be happy to provide those names provided the companies release me to do so.

Mr. **Gore**. Why can't you tell us the names of the companies?

Dr. **Imbus**. Again, I did this for the ATMI.

Mr. **Gore**. They said it is all right. I mean, they said it is all right to release the raw data. Well, we will ask. Presumably——

Dr. **Imbus**. Well, Mr. Chairman, I do not think there is going to be any problem with that, but on the other hand, I cannot sit here and give you the names of the companies without their permission.

Mr. **Gore**. I see. You have kind of a scientist-client relationship with ATMI. [Laughter.]

Is that correct?

Dr. **Imbus**. That is right. Well, I don't know if you are trying to be facetious, but I would say you are probably right.

Mr. **Gore**. Well, I am being only partly facetious, and let me be thoroughly serious for a moment. One of the problems, as science becomes politicized, is that scientists are retained by people with particular points of view, and their duties to the standards of scientific inquiry can, if we are not careful, become subordinated to what they perceive to be their duties to their client.

As chairman of the science investigations subcommittee, I hope that we as a Nation can find ways to prevent that occurring in science so that we do not come to a day when companies say, "Gentlemen, we don't need to hire a lawyer; we need to hire a scientist."

Dr. IMBUS. Mr. Chairman, I fully agree with your remark, and that is a problem. It is a problem with labor unions; it is a problem with government that gets it funding for sciences from certain projects; it is a problem everywhere.

On the other hand, I am sorry to hear the implication that you are putting on your rose-colored glasses for other groups and your dark glasses for the industry groups.

Mr. GORE. No, no.

Dr. IMBUS. There are reputable scientists on all sides of the fence, and there are ones that are biased on all sides.

Mr. GORE. I think I see it as a generic problem. It occurs with the industry in this instance because, if I heard your testimony correctly, OSHA requested that the industry compile this data. Is that correct?

Dr. IMBUS. That is correct.

Mr. GORE. Now, you cannot tell us the seven companies that were selected, but you can tell us that you believe those seven were selected because they were the ones that had good medical surveillance?

Dr. IMBUS. They had good medical surveillance, in my opinion, and they were in a position to provide data from a computer system that we could match up the data.

Mr. GORE. Now, were they collected for compliance purposes?

Dr. IMBUS. The data actually that was presented was data that was collected for compliance purposes.

Mr. GORE. And it is being used for epidemiologic purposes.

Dr. IMBUS. There were two points in the OSHA request. First, it asked, is there any recent epidemiological data; and second, it asked the question, what are the results of medical surveillance that has been done—based upon medical surveillance data from workers in the textile industry, what are the levels of risk?

So it asked for medical surveillance data, and that is what we provided, purely and simply.

Mr. GORE. All right. Now, you are not saying that the other 193 member companies do not have medical surveillance operations.

Dr. IMBUS. No, sir. I am not saying that they do or do not.

Mr. GORE. Well, did these seven have better medical surveillance?

Dr. IMBUS. They have data collection and analysis systems on computer that enable us to utilize the data in a pooled fashion. That was the basic criteria. In general, I would say that these are the more sophisticated companies, and they probably have better than average systems.

Mr. GORE. Did OSHA put a timeframe on the providing of the data when it requested it?

Dr. IMBUS. Yes, sir, they did, and it was impossible to get the data in by that date.

Mr. GORE. What was the original date?

Dr. IMBUS. I cannot tell you offhand.

Mr. GORE. Roughly, what month? December?

Dr. Imbus. No, sir. I think it was March.

Mr. Tritsch. March 26.

Mr. Gore. We get information from the walls in these subcommittee hearings. [Laughter.]

Dr. Imbus. Well, I am sorry. I do not have a lot of dates available. I am quite sorry about that.

Mr. Gore. I understand. That is fine. The original request was March 26.

Dr. Imbus. Right.

Mr. Gore. And you did not meet that deadline, is that right?

Dr. Imbus. No, sir.

Mr. Gore. I thought that was the date that you filed the report.

Dr. Imbus. If you will give me a minute, I will find out.

Mr. Tritsch. April 23.

Dr. Imbus. April 23. Thank you, sir.

Mr. Gore. Now, the request was made in February?

Dr. Imbus. Yes, sir.

Mr. Gore. Now, let me get this straight. Now, OSHA makes a request to the industry in February with a March deadline, and you are saying that because of the rush, you were unable to get anyone outside of the companies to review it, and it was difficult to really throw it together in time to meet the deadline that OSHA set.

Dr. Imbus. Sir, OSHA, in the advanced notice of proposed rulemaking, requested data from any interested party. When people submitted data, and all sides did, I would submit to you that very little of it was reviewed by any outside source. The data was submitted in the context of giving OSHA data from the industry. They could review it, and they could then request outside review.

What particularly concerns us is that the National Institute of Occupational Safety and Health, based upon methodology, completely rejected the data.

Mr. Gore. When were you retained by ATMI?

Dr. Imbus. I would guess sometime about the third week or so in February, a couple of weeks after this ANPR was published.

Mr. Gore. Now, you are saying that there was no request for data prior to the publishing of the ANPR?

Dr. Imbus. Oh, I think OSHA has always wanted data from industry, but this was a specific, formal request.

Mr. Gore. Was there a specific, informal request prior to the ANPR being published?

Dr. Imbus. Oh, I think on many occasions there have been informal requests.

Mr. Gore. Dr. Imbus, was there a specific request for information of the kind later submitted prior to the publishing of the ANPR?

Dr. Imbus. I am unaware of a specific request spelled out in this fashion.

Mr. Gore. Were you aware that you were going to play a role in putting this data together prior to the publishing of the ANPR?

Dr. Imbus. Absolutely not.

Mr. Gore. All right. Now, ATMI submitted a survey dated December 15, 1981, well before the ANPR, that was pretty severely criticized. Were you retained by ATMI to review and analyze that survey data?

Dr. IMBUS. At that time, I was employed by Burlington Industries, and as a member of the medical subcommittee of the ATMI, I am familiar with that, but I was not retained to put that data together.

Mr. GORE. Were you retained to review it at any subsequent date?

Dr. IMBUS. No, sir.

Mr. GORE. What were the sources of the ATMI data that you analyzed? Were they the same as the data included in that survey?

Dr. IMBUS. No, sir. The data included in the first survey that you are discussing was the result of a questionnaire sent to all ATMI member companies and asking some member in the company to complete the questionnaire.

The second study, with which I was involved, was specifically medical data taken from the medical departments of the companies that have full-time medical people associated with them.

Mr. GORE. Now, I understand that John Lumsden, who will testify later today, supplied ATMI with 42,535 workers' lung function data, and that the December 15 survey submitted by the ATMI covered 150,000 workers. You reported an initial study population of 50,945, rejecting some data and ending up with 41,173.

Now, on what basis did you reject data? How did you weed out the other 9,800?

Dr. IMBUS. The original group which was provided by the companies consisted of approximately 50,000 people. There was one company which, though it could provide the medical data, could not match the medical—that is, the spirometric results—with dust levels, and therefore we decided to eliminate that data from concern.

Later on, the data that you are referring to from Mr. Lumsden came in. Again, it was a hurry-up job. It was to be put into somewhat different context rather than pooled exactly with this data, and it was not used. We found some problems with it and did not use it.

Mr. GORE. Yes. Now, you are saying that 50,945, about 51,000, workers were studied and the data was provided, and 9,000 of the 51,000 were weeded out, and that was because—you are saying that for those 9,000 you had spirometric data but no dust level data. Is that correct?

Dr. IMBUS. That is correct.

Mr. GORE. Did you see the spirometric graphs on the 9,000 workers that were eliminated?

Dr. IMBUS. Mr. Gore, I did not see the spirometric results on any of these people, the graphs per se.

Mr. GORE. All right.

Dr. IMBUS. I saw a summary, just the same as with the other companies.

Mr. GORE. So of the 51,000, the companies eliminated 9,000 and told you that there was difficulty matching spirometric data with cotton dust data, but you did not see the spirometric data on the 9,000 eliminated in order to satisfy yourself that there might have been some anomaly in the level of spirometric data in those 9,000 that were eliminated.

Dr. Imbus. Yes, sir, I saw the results of the 9,000, not the raw data per se, and I saw no particular anomaly or problem or question. It was simply that when I asked the company, and that is one company, could you match the results with dust level, they said no, we cannot do this at this time.

For the purposes of our study, it was not satisfactory to use such data, so I take full responsibility for eliminating it. It was not a matter of the textile companies doing it. It was eliminated from one single company for that reason.

Mr. Gore. Dr. Merchant, could you comment on what difficulty scientists might encounter in a study of this kind without looking at the raw data.

Dr. Merchant. Well, I think a number of the problems with this type of data have been addressed in my testimony. I think the one that is of particular concern in the seven-company data is the problem that these companies, as I indicated, are undoubtedly among the more progressive textile companies in the industry. It was stated that they had had medical surveillance programs in place for a long period of time; hence, I suspect their dust levels and the degree of selection in their worker population is rather substantial.

Mr. Gore. In other words, they are the ones that have been prepared to really carefully scrutinize the people who apply for jobs so as to, hopefully, select from the job applicants a worker population that is less likely than the average to get lung disease.

Dr. Merchant. Well, this has gone on to some degree. The degree to which that has occurred I am not sure, and the degree to which that may have contributed to the decrease in disease reported by Dr. Imbus, I am not sure.

Mr. Gore. Now, let me ask you another question. They would also be the companies that are most geared up to medically remove workers who exhibit the early stages of byssinosis. Is that a fair assumption?

Dr. Merchant. I think it is. I think it is fair to say that these companies, if I read the report correctly, had indeed in many instances had surveillance programs in place for as long as 10 years, so there had been systematic removal, transferring, and identification of workers with abnormally low lung function, referral to chest specialists, and many of these workers, of course, left the industry as a result of this process.

So I think these companies certainly do have a highly selected work population. How different this may be from the rest of the textile industry is the precise reason that I believe NIOSH indicated that no generalization or inference could be drawn from this study to the industry as a whole.

Mr. Gore. Dr. Imbus, let me ask you, as a scientist, do you think it is generally accepted scientific procedure to base conclusions not upon raw data but rather upon a summary of the data prepared by nonscientists who have a vested interest in the outcome of the study?

Dr. Imbus. Well, the last part of your question says these are nonscientists. I would submit they are all medical directors with a scientific background, and, of course, the implication that somehow or other they are tilted, I will not even answer that because I do not think they are.

But to get back to the first part of your question——

Mr. GORE. Well, do you think they have a vested interest?

Dr. IMBUS. I think that these gentlemen, though they are employed with companies, are fully capable people. They can go anywhere. They can go with the Government or whatever.

Mr. GORE. That is not the question. Do you think they have a vested interest?

Dr. IMBUS. I think they have a vested interest in the health of the company, but to imply that they would shade their data because of some alleged vested interest I think is entirely wrong. I don't accept your premise a bit.

Mr. GORE. So you think it is perfectly acceptable scientific procedure to base your conclusions not on the raw data but rather on the summary of data prepared by a party with a vested interest in the outcome of the study.

Dr. IMBUS. I have not answered that question yet. Basically, I have just dealt so far with the question of vested interest. Now, as far as the question of whether or not you would base your data upon a summary rather than raw data——

Mr. GORE. No; on a summary prepared by someone with a vested interest.

Dr. IMBUS. Well, I do not accept the premise that it is prepared by someone——

Mr. GORE. Well, you accepted the statement that they have a vested interest, and they obviously do.

Dr. IMBUS. All right, but you imply bias, and I don't accept that, so we will say vested interest, but I do not——

Mr. GORE. Well, you think it is OK, then.

Dr. IMBUS. All right. Let's first of all talk about the scientific methodology, and then if you want to talk about——

Mr. GORE. Let me ask you, and I mean no discourtesy here—I have let the clock run too late. The rail strike vote is on, and please think about your answer, and we will take your response when we come back.

Dr. IMBUS. I already have, and I will, certainly.

Mr. GORE. It will be approximately 8 minutes.

[Recess taken.]

Mr. GORE. The subcommittee will come back to order.

Dr. Imbus, when we broke for the vote, we were discussing the scientific procedure that you used. You know, the integrity of medical directions is not the issue. The quality of the data is the issue. We do not know who administered the thousands of questionnaires involved, certainly not the medical directors, but nurses, technicians, those who, on a day-to-day basis, have to deal with blue collar workers, even to giving medical excuses and leaves, and it is well known that many employees, when they are not guaranteed confidentiality, will sometimes give other than straightforward descriptions in order to protect their jobs. If byssinotic, they have little incentive to tell the company that they are.

Given this, the manner in which the ATMI data was collected really calls it into question, it seems to me.

Dr. IMBUS. Well, it may call it into question in your mind. I really do not have any difficulty with it. In the first place, let me just go back a little bit.

No. 1, approximately 25 percent of that data was collected on a system that was set up by me and administered by me over a period of approximately 13 years. I trained many of the people; I supervised them; I am aware of the quality of the data, and I know what I have.

Now, basically, you say that, well, the employees withhold the information. Now, we found byssinosis symptomatic levels up to 30 percent in some of our plant areas when we first started out. It does not seem they were withholding them then. People have not been fired as a result of giving the information. It just kind of strikes me as funny that they would, all of a sudden, be withholding information.

No. 2, there is an objective finding, and that is the pulmonary function data, which is a before-and-after measurement to determine whether the employee has declined. Again, that we found to be present in very substantial amounts early on, and later on it was not.

So I am quite confident that the data that represents 25 percent of this study was collected under uniform measures and was very adequately supervised.

Mr. **Gore**. Was there any confidentiality?

Dr. **Imbus**. Yes, sir.

Mr. **Gore**. The confidentiality of the data collected was guaranteed?

Dr. **Imbus**. That is right.

Mr. **Gore**. I thought it was used for compliance purposes.

Dr. **Imbus**. If OSHA comes in and asks for a record, they do have the right to have that record, but OSHA and NIOSH have set up certain mechanisms to protect employees, so really that data is confidential.

Now, No. 2, as I say, I am quite confident of 25 percent of the data. No. 2, the other three quarters of the data was collected by people that I have had discussions with over a number of years. I know their basic methods and I know how they do things. Second, the data was quite consistent with the data that I had been collecting. So I really have no problem at all with that data. As a matter of fact, I am quite proud of it and I think it is a very good set of data, and I am very sorry that people like yourself and NIOSH refuse to open their minds to it.

Mr. **Gore**. Well, we would like to open our minds to it if we can get the data.

Dr. **Imbus**. The data is right here, and you already asked Mr. Martin about the raw data.

Mr. **Gore**. Let me ask you this. Were all the spirometric measurements done at the same time, after the start of a work shift, for all the companies?

Dr. **Imbus**. No; they were not all done. It would be literally impossible to do them all. They were generally started between a period of 4 to 6 hours. The early work that has been done shows that where there is an exposure, there is a significant decline at 4 hours, so it is quite valid to do this. However, in questioning the——

Mr. **Gore**. Some were not done between 4 and 6 hours?

Dr. IMBUS. No, they were all started within 4 to 6 hours. Some of them were done——

Mr. GORE. How do you know that?

Dr. IMBUS. Again, I have to ask the people that collected the data, and this is what they told me, and I have no reason to believe otherwise. I think they are complying with these types of measurements.

I would say that, based upon my experience and the questioning, the average is close to 6 hours of when these—the second set of data—fully adequate, in spite of the criticism that has been leveled against this, to show a decline in employees who are sensitive to such a decline.

Mr. GORE. Now, the postwork shift measurements were not consistently done 6 hours after the shift began. That is correct, right?

Dr. IMBUS. That is correct. They are not done such anywhere. There is no way that you can test 100 people or so and do them all precisely at 6 hours. It is not required; it is not necessary.

Mr. GORE. What questions from the questionnaire were used to define and diagnose byssinosis?

Dr. IMBUS. The basic questions that are used to define byssinosis are: Does the person have tightness in the chest? If so, if that person has tightness in the chest, does it occur on a particular day of the week? If it occurs on Monday or the first day of the workweek, whenever that happens to be, or after a vacation when the employee is away, and it occurs after the person comes into the mill, then it is symptomatic byssinosis.

There is another question there that says, Do you have shortness of breath? It grades your shortness of breath response. It also goes on; there is another set of questions that says, Do you have shortness of breath on Mondays which is worse? If that is graded such, then that also gives a byssinosis score.

Another one is a cough that is worse on Mondays. So those are the basic criteria. They have been built into the computer programs and are spit out very objectively by the computer.

Mr. GORE. Now, were retired and former workers included?

Dr. IMBUS. No, sir. The testing program does not include retired.

Mr. GORE. What dates were covered by the data?

Dr. IMBUS. Well, the data covered was the data that was collected in 1981.

Mr. GORE. 1981.

Dr. IMBUS. Right.

Mr. GORE. Now, if someone were employed for 20 years up until 1980 and the medical surveillance indicated that this individual had byssinosis, and the individual left the company, if that had occurred during December 1980, then that individual would not be included in the data submitted.

Dr. IMBUS. That is correct. This is what you call a cross sectional survey, which was the type of survey that was done for the original setting of the standard. A cross sectional survey is simply people who are there and present at the time that you did such survey, and that is what it consisted of.

Mr. GORE. Well, that certainly seems to raise a question of whether or not you had selective outmigration of byssinotic workers. Let me ask Dr. Merchant to comment on that. Do you see that as a problem with this kind of study?

Dr. MERCHANT. Well, clearly, in terms of drawing conclusions about the total magnitude of the problem, one needs to consider those who are retired as well as those who are employed. That is the uniqueness and the usefulness of the Yale studies. They sought to do this. It is the only study that has done that. In terms of getting a handle on not only the acute but the chronic problem, I think it really must be done.

Mr. GORE. Dr. Millar, do you have a comment on that subject?

Dr. MILLAR. I would just like to reiterate, Mr. Chairman, that our problem with this study really is that one cannot be sure that it is reflective of the industry as a whole. There are a lot of aspects of that, a lot of reasons for that, but that is, as far as we are concerned, the principal objection.

In order to make a recommendation for a change in the rule, we think that ought to be done only on the basis of new information that is reflective of the industry as a whole, and we just do not think these data are guaranteed to be. They may be; we just don't know that they are.

Mr. GORE. Yes. Do you intend to ask for the raw data?

Dr. MILLAR. The raw data? No, sir, we do not intend to ask for it.

Mr. GORE. Why not?

Dr. MILLAR. We think that in terms of investing staff time and resources in such a study, we would probably be better off if we initiated a study of our own, and then we could assure that randomization and other characteristics were built into it from the beginning.

Mr. GORE. Well, in other words, you think that the design of this whole inquiry was defective, rendering the data not very useful.

Dr. MILLAR. I think the design of it was such that we are not able to be assured that its results can be applied to the industry as a whole. That is the principal problem. One could assure that, presumably, by certain changes in the methodology, but rather than label the study defective, I think we need to focus on what is the real problem, and that is the inability to be assured that these data reflect the experience of the industry as a whole.

Mr. GORE. Well, now, there are 85,000 workers now exposed to cotton dust in the workplace, or 600,000, is that right?

Dr. MILLAR. That is what we estimate; yes, sir.

Mr. GORE. 600,000. How many have or are developing byssinosis?

Dr. MILLAR. That is not clear. The estimates that we have, based on data in the Department of Labor in 1977, indicate approximately 84,000.

Mr. GORE. 84,000 are suffering from exposure to cotton dust, and an estimated 35,000 have byssinosis.

Dr. MILLAR. No, sir. We estimate there are 600,000 workers exposed to cotton dust.

Mr. GORE. I understand.

Dr. MILLAR. In 1977, the Department of Labor estimated there were 84,000 cases of byssinosis, and another investigator estimated that there were 34,000 or 35,000 people who had chronic impairment and were severely disabled as a consequence of chronic lung disease, and who had also worked in the cotton industry.

Mr. **Gore**. Now, first of all, on the raw data, would a review of the raw data be helpful in either supporting or rejecting the conclusions drawn from the summaries of the data?

Dr. **Millar**. I am not sure what to tell you about that. My own view is that you could review all of that data and end up in the same position we are in now, and that is, because of the need to randomize selection we would still not be able to project these data to the industry as a whole.

Mr. **Gore**. Dr. Kleinerman, you say that your NAS study did not look at any workers; you simply reviewed the data.

Dr. **Kleinerman**. Yes, sir.

Mr. **Gore**. Based on that review, have you concluded that there is no relationship between exposure to cotton dust and byssinosis?

Dr. **Kleinerman**. No, sir, not at all. Our conclusions are that certainly there is byssinosis, and that is defined mostly by the acute symptoms. We find that there certainly is a chronic phase to exposure to cotton dust. The question is, what other factors enter into the development of the chronic lesion——

Mr. **Gore**. No, but is there, in your view, a causal relationship between exposure to cotton dust and chronic byssinosis?

Dr. **Kleinerman**. There is evidence, which is not complete, to indicate that there is some relationship between inhalation of cotton dust and the development of byssinosis; that is, the chronic phase.

Mr. **Gore**. What do you think we ought to do about it?

Dr. **Kleinerman**. Well, our committee recommended a series of research studies that should be done, among which are a longitudinal study to study the effects.

Mr. **Gore**. But in the meantime, there are tens of thousands of people who go into the mills healthy and come out of the mills with horrible symptoms. Should we do anything in the meantime, while we do longitudinal study? There are both smokers and nonsmokers involved.

Dr. **Kleinerman**. I think we certainly should not relax our standards. We should maintain as much prevention as is possible.

Mr. **Gore**. You would not recommend relaxing our current standards?

Dr. **Kleinerman**. That is right, sir.

Mr. **Gore**. All right.

Now, how were the members of the NAS panel picked?

Dr. **Kleinerman**. I am not entirely certain about how they were picked. There was a list of names that were furnished me, and members of the administrative staff of NAS, one of whom is here. Mr. Paul Sitton could give you better information about that than I.

My participation was to take from a list of names that was given to me certain people who I felt had experience in this area.

Mr. **Gore**. Well, most of the primary researchers in this area were not included on the panel. How was the preliminary list put together? It seems to have overlooked the leading people in the field?

Dr. **Kleinerman**. Well, no. I am sorry, sir, but there were many leading people in the field who were members of the panel. These included Dr. Hans Weill, Dr. Kaye Kilburn, Dr. Mario Battichelli, all of whom are current researchers in the field.

Mr. GORE. Now, was Dr. Kilburn on that preliminary list?

Dr. KLEINERMAN. Yes, sir.

Mr. GORE. And you recommended Dr. Kilburn, right?

Dr. KLEINERMAN. Yes, sir.

Mr. GORE. Now, the list that was given to you was prepared by whom?

Dr. KLEINERMAN. I am not sure how it was prepared.

Mr. GORE. Was Dr. Merchant on the list?

Dr. KLEINERMAN. Dr. Merchant's name was brought up, as a matter of fact. I brought his name up.

Mr. GORE. Was it on the list that was provided to you?

Dr. KLEINERMAN. I cannot remember if it was on the list.

Mr. GORE. Do you know why he was not included?

Dr. KLEINERMAN. He was not included because he represented a strong point of view. He had been vocal in his opinions concerning byssinosis, and it was felt that there should not be an excess of people who represented one or another point of view; there should be much more selection of people who were considered to be unbiased.

Mr. GORE. Was Dr. Battichelli a member of the panel?

Dr. KLEINERMAN. He was.

Mr. GORE. Did he have an established point of view on this?

Dr. KLEINERMAN. Yes. It is reflected he was a member of the majority opinion.

Mr. GORE. Most of his work has been done for the industry, correct?

Dr. KLEINERMAN. I think it has been done in an academic setting which I assume is free from any bias one way or the other.

Mr. GORE. Dr. Millar, do you think that the NAS panel was representative of or reflected the sample of the range of opinions on byssinosis?

Dr. MILLAR. I am not sure, in this context, what the full cohort of experts in byssinosis would be. I think that there were obviously some pretty high-powered scientists on the panel. It was a little surprising to me that Dr. Merchant was not, but I do not have any specific quarrel with the selection of the panel.

Mr. GORE. Dr. Merchant, you chaired this World Health Organization panel. Would you describe it as representative of the scientific views on byssinosis?

Dr. MERCHANT. Well, I think it was certainly representative of international authorities. As I indicated, many of the individuals on the panel had spent their working lifetimes or professional lifetimes studying the effects of these vegetable dusts. It had broad international representation from around the world, a number of different countries. It had representation from the ILO and from WHO. All of these people were employed by government or universities or by these two international health organizations.

So I think it was not only a very knowledgeable committee from their personal research experience, but internationally representative.

Mr. GORE. Do you know why Dr. Beck was not chosen for the NAS panel?

Dr. MERCHANT. Do I know?

Mr. GORE. Yes.

Dr. MERCHANT. No.

Mr. GORE. Dr. Kleinerman, do you know?

Dr. KLEINERMAN. No, I do not.

Mr. GORE. Would you regard him as an eminent scientist in this field?

Dr. KLEINERMAN. Yes, I think he is an authoritative worker in the field.

Mr. GORE. Yes.

[The following material was subsequently received for the record:]

NATIONAL ACADEMY OF SCIENCES
2101 CONSTITUTION AVENUE
WASHINGTON, D.C. 20418

January 6, 1983

Mr. Robert B. Nicholas
Staff Director
Subcommittee on Investigation
  and Oversight
Committee on Science and
  Technology
House of Representatives
Washington, D. C. 20515

Dear Mr. Nicholas:

At the [redacted] held by the Subcommittee on the subject of causes of occupational diseases, [redacted] Among the witnesses was Dr. Jerome Kleinerman, Chairman of the National Research Council's Committee on Byssinosis, who delivered remarks on the findings of that Committee's report.

At this hearing the Chairman asked how the members of the Byssinosis Committee were selected. In response, Dr. Kleinerman indicated that he was not familiar with the detailed procedures for committee selection used by the National Research Council and suggested that it was more appropriate that Academy staff in attendance at the hearing should respond. I was in attendance at the hearing to respond if that was necessary. You may wish to include the following information concerning these procedures in the Subcommittee's hearing record.

The National Research Council has a long established procedure for assuring the selection of committee members of the highest competence and also giving due regard to appropriate balance. Members are appointed on the strength of their professional qualifications and while they may come from the academic, industrial, governmental, or another sector of society, they do not serve as representatives of any agency, group, or institution unless they are specifically so designated upon appointment. Every committee that formulates a position, takes an action, or prepares a report in the name of the National Research Council must go through several layers of review and receive final approval of the Chairman of the National Research Council.

With respect to the Committee on Byssinosis, the list of candidates for nomination to the Committee was initially assembled by the professional staff person assigned to work on this task. Names were identified for inclusion in this list after discussion with other professional staff of the National Research Council, the Chairman and members of the Assembly of Life Sciences, members of the National Academy of Sciences, Federal agency liaison representatives and others. This list was further reviewed by Dr. Kleinerman, who had previously been appointed as Chairman of the Committee. A final list was then prepared by staff and submitted for review and approval by the Chairman of the National Research Council.

Since the membership of the Committee is limited, it is reasonable to expect that all experts in the field can not be appointed. I would, however, like to clarify your question and Dr. Kleinerman's response as to why Dr. James A. Merchant was not selected for appointment to the Committee. A review of the selection process for this Committee established the fact that Dr. Merchant's name was initially placed on the list of candidates at the request of Dr. Kleinerman. During the screening of the candidates, it developed that Dr. Merchant had been assigned to assist the Occupational Safety and Health Administration in the preparation and review of material associated with rule making proceedings on a revised cotton dust standard. In light of this involvement, it was concluded that his close association with the administrative proceeding could present an awkwardness with respect to his participation as a member of the Committee. The circumstances of his governmental responsibilities and assignments at that time and not the manifestation of any bias on his part, was the underlying reason for not including him as a member of the Committee.

Mr. Robert B. Nicholas
January 6, 1983
Page Three

For your further information, I also have enclosed a copy of the Academy's response to Dr. Donald Millar's letter of August 25, 1982. Since Dr. Millar's letter to the Academy was placed in the record, you may wish also to include our response to him.

I appreciate the opportunity afforded to clarify these points.

Sincerely yours,

Paul L Sitton

Paul L. Sitton
Assistant to the President

Enclosure

NATIONAL RESEARCH COUNCIL

2101 CONSTITUTION AVENUE WASHINGTON, D. C. 20418

OFFICE OF THE CHAIRMAN

September 22, 1982

J. Donald Millar, M.D.
Assistant Surgeon General
Director
National Institute for Occupational
Safety and Health
Centers for Disease Control
Atlanta, GA 30333

Dear Dr. Millar:

I am responding to your letter of August 25, 1982, in which you express concern about the report Byssinosis: Clinical and Research Issues.

The primary task of our committee was to delineate the kinds and methods of research that may be most productive in determining the agent(s) that cause byssinosis. In pursuing this objective, the committee that prepared the report reviewed the available evidence regarding an association between long-term exposure to cotton dust and the development of chronic lung disease. In contradistinction to the point you make in your letter, the committee has concluded that a chronic cotton dust-related effect does occur, but it cannot be accurately distinguished from chronic bronchitis either functionally or pathologically. Thus, the report does not deny the existence of chronic pulmonary disease in workers exposed to cotton dust, but attempts to define the nature of chronic effects and, thus, clarify the nature of the disease. The committee also examined the association between a chronic effect and acute byssinosis and stated on page 14: "A link between the acute and chronic response, although biologically plausible, remains to be confirmed by longitudinal studies."

The committee has reviewed the literature relating morbidity of cotton workers, decline in lung function, and dust concentration, and has reached conclusions which are different from those which you express. The committee has suggested that additional studies are required to address this question.

THE NATIONAL RESEARCH COUNCIL IS THE PRINCIPAL OPERATING AGENCY OF THE NATIONAL ACADEMY OF SCIENCES AND THE NATIONAL ACADEMY OF ENGINEERING
TO SERVE GOVERNMENT AND OTHER ORGANIZATIONS.

The crux of the issue seems to be the dilemma about making judgments when scientific evidence is incomplete. Our committee, in the absence of critical evidence to support an unequivocal relationship, chose to identify the issue as one deserving further study. But it also stated: "The Committee does not intend to imply that the need for such studies precludes the need for maintenance of adequate dust controls in the working environment." One member of our committee states in a minority view appended to the report a view similar to yours, but the view was not subscribed to by other members of the committee.

One may hope that the results of further research as recommended in the committee's report will provide unequivocal evidence convincing to all scientists. Until such time as more evidence is available for analysis, I see no advantage to a further review of this subject by the National Research Council.

Yours sincerely,

Original signed by
Frank Press

Frank Press
Chairman

AGL/FP/ush

Mr. GORE. Now, that study came out after your NAS review of the literature was published, right?

Dr. KLEINERMAN. Yes, sir.

Mr. GORE. Have you had a chance to look at it?

Dr. KLEINERMAN. Yes, I have, but I cannot recall at the moment.

Mr. GORE. You do not know whether or not that changes your view of the weight of the evidence?

Dr. KLEINERMAN. No, I am sure it does not change our weight of the view.

Mr. GORE. All right. Now, you have attached a copy of two new studies to your testimony this morning, is that correct?

Dr. KLEINERMAN. Yes, sir.

Mr. GORE. Now, the first study was done by whom?

Dr. KLEINERMAN. It was done by a panel of experts including Dr. Morgan, Dr. Geeh, Dr. Willoughby, and others.

Mr. GORE. And who funded the study?

Dr. KLEINERMAN. I think Cotton Inc.

Mr. GORE. Cotton Incorporated?

Dr. KLEINERMAN. Yes, sir.

Mr. GORE. The second study is a critique of the first, is that correct?

Dr. KLEINERMAN. No, the second study was a review of mortality statistics from a flax work in North Ireland.

Mr. GORE. And, Dr. Merchant, are you familiar with that article, which I believe was published in Lancet magazine?

Dr. MERCHANT. Yes, I am. This is the Elwood article?

Mr. GORE. Yes. What is your view of that study?

Dr. MERCHANT. Well, during the break, I was telling Dr. Kleinerman that he failed to, in his testimony, also supply the committee with Prof. Richard Schilling's rebuttal to that, which has been published for some time, in Lancet. Comments of Professor Schilling were really twofold on that. One was that the authors had failed to consider previous mortality experience in drawing their conclusion; indeed, there is substantial evidence of older mortality studies of grossly excess mortality among cotton textile workers. There is also some evidence of a dose-related or certainly work area-related increase in mortality from older studies of cotton textile workers in Lancashire. There is also evidence of gross increase in mortality among hemp workers in Spain, where the mean mortality among hemp workers was in the neighborhood of 40 years of age, whereas, compared to agricultural workers living in the same regions, the mortality, or longevity, was in the neighborhood of 60 years.

So these gross evidences of increased mortality were overlooked, not only not reported by Elwood but also by the National Academy of Sciences report.

The second point that Professor Schilling made in his letter was that to state that they are unaware of any association or no increase in mortality is associated with a significant increase in morbidity flies in the face of the morbidity data, of which there is an abundance in the literature, some of which I have reviewed in my testimony and more of which I reviewed in the several papers that have been appended to my testimony.

Mr. GORE. Now, Dr. Millar, Dr. Imbus had some pretty scathing things to say about your Institute in his testimony, and I want to give you a chance to respond. He said that your review of his study is, quote, reflective of the cavalier, misinformed, unconstructive approach which has characterized NIOSH's handling of the whole cottton dust issue, end quote. Do you want to comment on that?

Dr. MILLAR. Well, being a native Virginian, I suppose the word "cavalier" has some appropriate connotations. [Laughter.]

But anyway, I do not think we responded that way; in fact, we took his report very seriously, and our staff examined that report seriously and wrote comments on it that covered several pages, and we were careful to look in as much detail as we could at the evidence before us, and I do not think we did in fact handle it in a short-sighted, cavalier way.

We do not respond that way to data presented to us from industry or from any other serious quarter. Indeed, I think we may have chosen words in our response to OSHA which have been misinterpreted when we said that these data should be disregarded by OSHA in its rulemaking effort. I think it is important to understand the narrow context of that statement, that we are really talking here about data which might or might not influence a proposed change in rulemaking. In that narrow context, we thought the data should be disregarded because we did not think they offered any reason to change the standard. But we certainly did not disregard or dismiss this study; out of hand in fact, we thought it was a very interesting and substantial contribution. I think we have said that in our remarks.

Mr. GORE. Dr. Imbus, you report in your study only three ranges of exposure, zero to 200, 200 to 500, and greater than 500. How did you select these ranges?

Dr. **Imbus**. Sir, before I answer that, would there be any possibility that I might amplify or respond a little more on one concern?

Mr. **Gore**. Sure, yes.

Dr. **Imbus**. All right.

Mr. **Gore**. Briefly, if you would.

Dr. **Imbus**. I would just like to quote from the critique that talks about methodological problems; then it says, "For this reason, this review will detail the shortcomings of the methodology rather than comment on any of the data presented in the more than 80 tables," which leads me to believe that they really did not bother with the data per se.

Now, the thing that really does concern me, and again, as I said ealier, it is a vantage point that you are coming from on this thing, I think the confusion here is that Dr. Millar is concerned about whether this data is representative of the textile industry as a whole, maybe to answer the question of the issue, Does cotton dust cause permanent, irreversible lung disease?

I did not say that this study represents the textile industry as a whole. We never contended such. We simply presented this in the context, Mr. Chairman, that if you will do a combination of things as were done by the companies in this report, you will achieve a very low level of pulmonary disease and problems of employees being affected by cotton dust.

The purpose, then, of presenting this was to show that a combination of things, not just the dust level alone, could achieve this remarkable result. It said it could achieve; it did not say that everybody is necessarily doing it. I don't know, but I think the study very amply does demonstrate this, and I would submit that that is important from a rulemaking process.

Now, I am sorry. I went on and I forgot your question.

Mr. **Gore**. No, that is fine. The study chooses only three data points.

Dr. **Imbus**. All right, the dust level points.

Mr. **Gore**. Ranges of exposure, the zero to 200, 200 to 500, and greater than 500. How did you select those ranges?

Mr. **Gore**. Well, actually, of course, the zero to 200 is the level below the OSHA standard. The 500 level is the level that the ATMI had proposed as being an appropriate standard, and the 200 to 500, of course, is the levels in between that. So we felt that was an appropriate selection.

We were concerned, however, that we had not narrowed it down quite as much as we would like to, and we were therefore able to find a subset that had the levels narrowed into 100-microgram ranges, zero to 100, 100 to 200, and so forth, and we did put this in as a subset of the data and were able to amplify on this.

Mr. **Gore**. Well, now, wouldn't these wide ranges mask some valuable information?

Dr. **Imbus**. Well, as I say, I was concerned about that, and that is why we did take a subset that we were able to get narrower ranges in the 100-microgram ranges, and indeed, with this, when we did this, we felt very good about having selected the original wide ranges, because we did not see dramatic differences.

Mr. **Gore**. Well, the range that is controversial is the range from 200 to 500.

Dr. **Imbus**. That is right.

Mr. **Gore**. If somebody had a very different effect at 210 than at 500, the study would not have picked that up.

Dr. **Imbus**. Well, that is why I say that we did take a subset where we had 100-microgram ranges. We looked at the characteristics of the people, and we believe they were not unrepresentative of the whole group. This subset included approximately 20,000 workers, as I recall, and it did examine the levels from 200 to 300, 300 to 400, and 400 to 500 micrograms, in addition to the above 500-microgram level, and did not see within that range a consistent dose response relationship.

Mr. **Gore**. Without objection, I would like to include in the record a letter that you, Dr. Millar, sent to Dr. Frank Press, chairman of the National Research Council with the NAS, which represents your view, I take it, of the NAS study.

[Material to be provided follows:]

Dr. Frank Press,
Chairman,
National Research Council, Washington, D.C.

Dear Dr. Press: A most distressing report from the National Academy of Sciences has recently come to my attention.

This document is both depressing and distressing. It is depressing in its narrowness of viewpoint, in the superficiality of its review of the literature, and in the glibness of its tone. It is most distressing from the point of view of public health and preventive medicine. By its facile denial of the existence of caronic pulmonary disease in workers exposed to cotton dust, the report ignores 300 years of clinical and epidemiologic observation which may, as a result, seriously undercut a national effort to eradicate byssinosis from the American workforce.

Chronic pulmonary disease in cotton workers was first recognized by Ramazzini in 1713.

Mortality studies in the cotton textile industry in Britain in the nineteenth and early twentieth centuries showed marked excesses of deaths in the higher age groups from bronchitis and pneumonia. Those findings were confirmed in the U.K. in follow-up mortality studies undertaken by Schilling in the 1950's. More recent mortality studies in the cotton industry, undertaken after partial reductions in dust exposure had been achieved, have not shown overall excesses of deaths, but have found increases in cardiovascular and in total deaths with increasing duration of cotton dust exposure.

Morbidity studies of cotton workers have been conducted in a number of countries since the 1950's. They have consistently found a strong dose-response relationship between exposure to respirable cotton dust and the prevalence of chronic lung disease, a relationship which largely explained observed differences in the prevalence of lung disease between different mills and mill areas (the so-called "mill factor"). Also an interaction between cigarette smoking and cotton dust exposure has been noted consistently in the epidemiologic studies to be an important risk factor which affected byssinosis prevalence.

The clinical hallmarks of the chronic lung disease found in cotton workers are cough, increased sputum production, and dyspnea. The functional correlate is respiratory outflow obstruction. In an epidemiologic study of a cotton mill community in the United States (Bouhys, 1977) 18 percent of the workers who had retired prematurely were found to have left work in the cotton mills because of disabling chest symptoms. On the basis of these data, it was estimated that there are at least 35,000 men and women in the United States suffering from severe, disabling, and irreversible chronic lung impairment associated with their work in textile mills.

Byssinosis is not a necessary element of either the human condition or of work in a textile mill. It can be prevented by stringent reduction in occupational exposure to cotton dust coupled with programs for medical surveillance and worker education. It is particularly essential that information on the adverse effects of smoking be provided to exposed workers.

The National Institute for Occupational Safety and Health has developed programs for reduction of cotton dust exposure in textile mills, for surveillance, and for worker education. Progress is being made toward the elimination of byssinosis.

By denying the very existence of chronic lung disease associated with cotton dust exposure, the NAS report threatens to undermine this effort.

I should like to urge you to convene a special panel at the National Academy to review again the issue of byssinosis. The present report does a service neither to the Academy nor to the health of the public.

Sincerely yours,

J. Donald Millar, M.D.,
Assistant Surgeon General,
Director.

Mr. Gore. Would you like to elaborate on your stated view that the study is "both depressing and distressing"?

Dr. Millar. Yes, sir, I would, just to the extent of saying that these are obviously subjective, emotional responses. They grow out of the fact that I have a great deal of respect for the sort of work that NAS does, and I felt very distressed in this situation. I thought the position they were taking was going to undermine an important preventive practice. So these statements, I think, reflect emotional reactions.

Mr. Gore. Now, you agree, though, that it contains a, quote, facile denial of the existence of chronic pulmonary disease in workers exposed to cotton dust and ignores 300 years of clinical and epidemiologic observation and may, as a result, seriously undercut a national effort to eradicate byssinosis from the American work force?

Dr. Millar. I think that reasonably summarizes my views.

Mr. Gore. All right.

Dr. Kleinerman, let me give you a chance to respond.

Dr. Kleinerman. Well, I have seen a copy of Dr. Millar's letter, and I might say I also saw the response which was mailed to him, I believe this morning. I think Dr. Millar's statements were indeed emotional and not factual. For one thing, the committee report did not indicate that there was not a chronic phase. It did say that there was a chronic phase, but it merely indicated that the chronic phase and its relationship to the acute phase were not well demonstrated.

I would suggest respectfully that the majority of his criticisms are not factual but rather emotional, and I must say I agree with the fact that I would like to see an effort to quell the disease continued. But I also would like to see truth brought to this embroiled state of lack of understanding about how the disease progresses and how it develops.

Mr. Gore. All right.

Dr. Millar, while you are here, I want to ask you about two related subjects before we conclude this panel. First of all, are you familiar with the pamphlet on byssinosis that was pulled back by OSHA in early 1981?

Dr. Millar. Yes, sir, I am.

Mr. Gore. Do you think that pamphlet was an accurate document?

Dr. Millar. I think it rather accurately described the purpose of the OSHA standard and the sort of preventive approaches that were recommended and should be taking place in the industry to prevent the disease.

Mr. Gore. Why was it pulled back out of circulation, do you know?

Dr. Millar. I do not know that.

Mr. Gore. You would not have pulled it out of circulation, is that correct?

Dr. Millar. Well, it was not our document to pull or not pull.

Mr. Gore. Yes.

Dr. Millar. But I think that what it had in it in terms of content was an accurate reflection for the worker. Now, you have to understand, I think, in this context that it was not a scientific document aimed at researchers or professional people; it was designed for the worker, and I think it accurately portrayed what the worker needs to know in order to be aware of the risks of this disease.

Mr. Gore. Now, let me ask you, on another subject, we had a hearing on formaldehyde not long ago, and DuPont prepared an epidemiologic study which you have reviewed. Could you summarize your review of that document?

Dr. Millar. I would have to say right off the bat that I have not reviewed the study; the study was reviewed by NIOSH staff in our Cincinnati Division of Surveillance and Hazard Investigations, and they have in fact written a report to Dr. Bruce Karrh providing their findings. I would be happy to read from the letter that Mr. Bierbaum sent back.

Mr. Gore. Please do.

Dr. Millar [reading]:

Thank you for providing NIOSH with a copy of your mortality study entitled, "Epidemiologic Study of Cancer Deaths in DuPont Workers with Potential Exposure to Formaldehyde." My staff—

Dr. Bierbaum's staff—

has reviewed the report, and in general we were concerned about the analytic methods and study design that were used. Especially important, we found the study to be weak in its statistical power to detect upper respiratory tract tumors.

Hence, we are concerned about your statement that this study supports the conclusion that airborne formaldehyde levels of one part per million, time weighted average, and two parts per million ceiling, provide adequate employee protection.

It goes on to say that because of interest in this, we would send a copy of our critique to OSHA and CPSC.

Attached to that letter was a specific critique of four pages which includes a lot of sophisticated commentary about epidemiologic methodology.

Mr. GORE. Without objection, I would like to ask that that be provided for the record of the earlier proceeding with respect to formaldehyde, because your review was occasioned by that inquiry.

I think there is a common denominator between these two hearings and between these two studies. We are reaching the point where society is getting a little better at protecting Americans in the workplace from known hazards, but as we get more sophisticated, we begin to have more arguments about the science that supports various efforts to protect American workers.

It is critically important that the increasing number of debates about scientific studies, where the protection of health and safety in the workplace is concerned, be conducted according to established scientific standards. We will be ill-served if we develop a science in this country that is an advocate-based science, where parties to a scientific dispute that involves millions of dollars hire themselves scientists to do battle as if they were hiring lawyers to do battle in the courtroom.

So it becomes more important to have peer review, to have analysis of the data collected openly, because we cannot have this kind of battle of scientists removed from public view when one side has the capacity to hire scientists and the other side has a diminishing capacity to hire scientists. Besides that, it is not good for science itself if it becomes fraught with advocacy.

In this case involving byssinosis, I personally believe that it is fair to summarize the events in the following way: The weight of the scientific evidence clearly supports the current standard on cotton dust exposure. The industry does not like the current standard and has fought it vigorously. Having lost on economic grounds in the Supreme Court, they turned to an effort to reopen the scientific argument that supported the current standard. Even though the weight of scientific analysis still clearly supports the current standard, OSHA, at the behest of industry, has reopened the scientific debate because they knew of this study underway by the industry. It requested information from the industry and received a scientific study based upon data collected by the industry, selected by the industry, and summarized by the industry, without any peer review, without any openness as to raw data, and on that basis, OSHA is now discussing the changing of the standard. Whether they do so or not remains to be seen. Of course, we had hoped today to hear from OSHA but, because of Mr. Auchter's sudden illness, will not be able to do so.

I would like to thank all members of this panel and ask if it would be possible to provide some short additional questions in writing for the record. Is that agreeable to all of you? If it is not agreeable, speak up.

[See appendices B and C.]

Mr. GORE. Well, thank you very much. We appreciate your presence here today.

Let me advise our next panel that we are going to have a brief recess. If somebody wants to get a bite to eat, we are going to reconvene in about 30 minutes, about 20 minutes after 2. We will come back at that time.

AFTERNOON SESSION

Mr. VOLKMER. The subcommittee will come to order, and we will proceed with the hearing, with our third panel, consisting of Mr. John Lumsden, vice president of ELB Associates of Chapel Hill, N.C.; Mr. John C. Brooks, commissioner of North Carolina Department of Labor, from Raleigh; Dr. Ruth Ruttenberg, Ruttenberg & Associates, here in Washington, D.C.; and Percy L. D. Thackston, executive vice president of the Bahnson Co., Winston-Salem, N.C., representing the American Textile Machinery Association.

If you have prepared statements, those will be made a part of the record, and you can proceed in the order in which your name was called, and you can either review your statement if you wish or give a synopsis of it. Following the testimony of all four, we will proceed with questions.

Mr. Lumsden, would you proceed.

STATEMENTS OF JOHN C. LUMSDEN, VICE PRESIDENT, ENNIS, LUMSDEN, BOYLSTON & ASSOCIATES, INC., JOHN C. BROOKS, COMMISSIONER, NORTH CAROLINA DEPARTMENT OF LABOR, RUTH RUTTENBERG, SENIOR ASSOCIATE, RUTTENBERG, FRIEDMAN, KILGALLON & ASSOCIATES, AND PERCY L. D. THACKSTON, EXECUTIVE VICE PRESIDENT, THE BAHNSON CO.

Mr. LUMSDEN. Thank you, Mr. Chairman.

My remarks will be short, and I think, in observation of the present hour, that might be appreciated. I will just make a review of what I have submitted to the committee.

I am primarily an industrial hygiene engineer. I want to preface my remarks or observations by this to say that I am not necessarily an expert in textile technology, but I am an outside health investigator looking at the textile industry.

In discussion about the existence of effective dust control technology as we see it today, I have been in a position to observe the textile industry for more than a couple of decades and have witnessed the development of dust control technology, particularly as it has been applied to yarn manufacturing.

Being an engineer, I have felt that the solution to the health problems of dust exposure in textiles lay in ventilation control, at least until the offending agent is identified and a more positive control method is discovered, either by chemical or biological processes and methods.

We divide yarn manufacturing roughly into two categories of processes, which I will call fiber preparation and yarn manufacture. Earlier studies have shown that the higher dust exposures occurred in fiber preparation, and I include opening and picking and carding and drawing, combing, roving or slubbing, combing, lapwinding, and those processes that precede the spinning process.

These processes presenting the higher potential for exposure were given priority for attention to dust control, and I feel it is safe to say that technology now does exist and is available today to control dust at these processes.

Exhaust ventilation systems for dust capture and control and material handling equipment can be designed and retrofitted to the machines in fiber preparation areas to control dust levels to OSHA standards.

Many of our clients that are using our environmental monitoring services have reached compliance in these work areas or are well on the way to achieving compliance. To be specific, opening hoppers are exhaust ventilated, opening conveyor lines are covered and exhausted or vacuum doffed, fiber cleaners are enclosed and ventilated, pickers have been fitted with effective ventilation systems or eliminated altogether by modern methods of feeding carding engines. The carding process, with probably the highest potential for dust generation, can be effectively controlled by ventilation systems, as can the drawing operations.

The configuration of the machinery or frames used in the roving process does not easily lend itself to dust control by local exhaust ventilation. However, this particular operation is not normally a high dust level generator, and virtually all roving areas are within the OSHA standard without additional effort toward dust control.

Processes in the yarn production plant subsequent to what I have called fiber preparation present a different engineering problem for the ventilation control of dusts. The machines or frames that accomplish spinning, twisting, spooling or winding have not yet been retrofitted with local exhaust ventilation systems. Rather, dust control has been effected by general dilution ventilation where large quantities of room air are drawn in through an air wash unit and returned to the workplace.

The primary purpose of these air wash units is to control the humidity and temperature in the production area, and their efficiency as a dust control measure is variable. Therefore, some of the yarn manufacturing areas such as winding remain over the OSHA standard. Spinning rooms are usually in compliance without additional effort toward dust control. However, there are, of course, a few exceptions to this.

A possible engineering answer, then, to the few continuing dust problems in these areas may be to upgrade the dust capturing capability of the air wash units which would return cleaner air to the workplace for dilution of the dusts.

So we see that engineering methods are available for dust control in the early processes of manufacture but are not yet that specific for the latter processes where finished yarn is handled.

A number of other dust control concepts, other than ventilation control, have arisen on the market and probably should be mentioned. We have chemical treatment of floors and walls of the workplace to attract and retain dusts. We have chemical additives to air-wash water, to control ion generation. We have low voltage electrostatic collection units placed throughout the work area and the installation of multiple ceiling-hung air filtration units, to name a few.

To my knowledge, none of these concepts have yet seen widespread use as a panacea for dust control in spinning, winding, spooling, and twisting areas, although some limited success has been reported in certain installations.

It is our company's experience that 80 to 85 percent of textile yarn manufacturing work areas are now in compliance with the OSHA standard. A number of plants have achieved total compliance on all shifts, and it has also been our experience that knitting and hosiery plants have been and remain in compliance with the standard.

To my knowledge, weaving departments within integrated textile plants and weave plants or cloth mills are generally within the OSHA standard. Apparent dust levels that exceed the standard in weaving usually reflect the contribution of lubricating oil mists and/or high dissolved solids content of humidifying waters. Neither of these constituents of airborne particulates contribute to the risk of byssinosis.

Unfortunately, the vertical elutriator presently used as the standard for cotton dust measurement is not specific, and all particulate matter in the less than 15-micrometer diameter range is recorded as part of the sample.

For weaving work areas that are presently above the OSHA standard, I know of no positive dust control system available for ventilation.

If we look at the progress made by the textile industry toward compliance with the cotton dust standard, the early efforts toward dust control in some textile companies began about the time that the OSHA standards were issued in 1970. These early efforts were directed more toward lint control than the control of fine dusts that had been shown to be of biological significance.

In 1978 the expanded version of the cotton dust standard focused on these fine dusts, and dust control techniques then developed for a new approach to reducing workroom levels.

The demonstration of progress toward compliance since 1978 may best be obtained from OSHA compliance records. However, this week I did a quick survey of cotton dust sampling data from our files in our company, and the dust survey records of 44 cotton textile yarn mills were quickly reviewed for the comparison dust levels in 1979 and 1982. These 44 plants yielded 528 separate work areas for which average dust measurements were recorded in 1979, and 523 of these same areas remained and were measured again in 1982.

In 1979, 61.5 percent of the work areas were in compliance. In 1982, 81.3 percent were in compliance. Fifteen of the plants were in full compliance at the last scheduled sampling period.

This is certainly not an extensive study; however, it reflects progress that one could expect has been made in dust control in the 3 years among these plants which were selected from our files of our company.

In regard to productivity as affected by the cotton dust standard, in the past decade, equipment and process changes have tended to increase the productivity in yarn and cloth manufacturing. At the same time, these yarn and cloth manufacturing plants have actively pursued control of cotton dust exposures. Both achievements have come about essentially as parallel developments in the industry. I feel that dust control played a part in the acceptance and use of new processes and equipment. However, the production advantage in going to the new method was an economical necessity for acceptance.

For example, new high-speed cards of this decade have considerably high production rates. This gives them also the potential for generating higher dust levels. However, the design of these new cards is such that the ventilation control of fugitive dusts is facilitated, and the result is lower exposure to the card tenders. Some new cards have dust control systems as an integral part of the design, ready to be easily connected to a central vacuum system of the plant. Since older, slower cards can also be adequately exhaust-ventilated for dust control, it is not likely that they would be replaced without a production advantage.

The modern method of cleaning and feeding raw cotton fiber to cards by a pneumatic transport and distribution system has eliminated the need for the picking process and the manual handling of picker laps or large rolls of cotton fiber. Picking, a dust-producing operation, can be successfully retrofitted with dust control systems. So it is my opinion that decisions that chute-feed card systems for cards are feasible have been based primarily on reductions in labor and improvement in uniformity and the quality of the product, with elimination of a dusty process a secondary consideration.

Open-end spinning has replaced traditional ring spinning, where yarn styles and quality allow this new process to be used. The open-end spinning processes, however, was developed as a production improvement before our recognition of byssinosis as a problem in the United States. The configuration of these machines also facilitates good dust control by local exhaust ventilation methods, making it generally a less dusty operation than conventional spinning.

The decisions to switch to open-end spinning by some textile plants are very likely made for production reasons, but at the same time dust problems would not be increased and very likely reduced.

Similar innovations have been made in weaving departments where looms of new principle and configuration are replacing slower fly shuttle looms and also in the opening rooms of yarn manufacturing plants where mechanical handling of raw cotton is replacing manual methods.

The rather extensive dust collection and filtration systems that one now sees in most textile plants, however, in my view, have been installed for the purpose of reducing workplace dust levels and do not measurably contribute to production levels in the plant.

Thank you.

[The prepared statement of Mr. Lumsden follows:]

Prepared Statement of John C. Lumsden, Vice President, Ennis Lumsden, Boylston & Associates, Inc.

CREDITS:

1. CERTIFIED BY AMERICAN BOARD OF INDUSTRIAL HYGIENE (#478)

2. ADJUNCT PROFESSORSHIPS AT:
   UNIVERSITY OF NORTH CAROLINA, CHAPEL HILL, N.C.
   NORTH CAROLINA STATE UNIVERSITY, RALEIGH, N.C.
   DUKE UNIVERSITY MEDICAL CENTER, DURHAM, N.C.

3. CO-AUTHOR OF SEVERAL PUBLISHED TECHNICAL PAPERS RESULTING FROM MERCHANT BYSSINOSIS STUDY.

1. AVAILABILITY OF EFFECTIVE DUST CONTROL TECHNOLOGY IN THE TEXTILE INDUSTRY:

I HAVE BEEN IN A POSITION TO OBSERVE THE TEXTILE INDUSTRY FOR MORE THAN TWO DECADES AND HAVE WITNESSED THE DEVELOPMENT OF DUST CONTROL TECHNOLOGY. PARTICULARLY AS IT HAS BEEN APPLIED TO YARN MANUFACTURING. BEING AN ENGINEER, I HAVE FELT THAT THE SOLUTION TO THE PROBLEM OF DUST EXPOSURE IN TEXTILES LAY IN VENTILATION CONTROL, AT LEAST UNTIL THE OFFENDING AGENT IS IDENTIFIED AND A MORE POSITIVE CONTROL METHOD IS DISCOVERED EITHER BY CHEMICAL OR BIOLOGICAL PROCESSES.

IF WE DIVIDE YARN MANUFACTURING ROUGHLY INTO 2 CATEGORIES OF PROCESSES, FIBER PREPARATION AND YARN MANUFACTURE EARLIER STUDIES SHOWED THAT THE HIGHER DUST EXPOSURES OCCURED IN FIBER PREPARATION. IN FIBER PREPARATION, I INCLUDE OPENING, PICKING, CARDING, DRAWING, COMBING AND ROVING OR SLUBBING. THESE PROCESSES PRESENTING THE HIGHER POTENTIAL FOR EXPOSURE WERE GIVEN PRIORITY FOR ATTENTION TO DUST CONTROL AND I FEEL IT IS SAFE TO SAY THAT TECHNOLOGY EXISTS AND IS AVAILABLE TODAY TO CONTROL DUST AT THESE PROCESSES.

EXHAUST VENTILATION SYSTEMS FOR DUST CAPTURE AND CONTROL AND MATERIAL HANDLING EQUIPMENT CAN BE DESIGNED AND RETROFITTED TO THE MACHINES IN FIBER PREPARATION AREAS TO CONTROL DUST LEVELS TO OSHA STANDARDS.

MANY OF OUR CLIENTS THAT ARE USING OUR ENVIRONMENTAL MONITORING SERVICES HAVE REACHED COMPLIANCE IN THESE WORK AREAS OR ARE WELL ON THE WAY TO ACHIEVING COMPLIANCE. TO BE SPECIFIC, OPENING HOPPERS ARE EXHAUST VENTILATED, OPENING CONVEYOR LINES ARE COVERED AND EXHAUSTED OR VACUUM DOFFED, FIBER CLEANERS ARE ENCLOSED AND VENTILATED, PICKERS HAVE BEEN FITTED WITH EFFECTIVE VENTILATION SYSTEMS OR ELIMINATED ALTOGETHER BY MODERN METHODS OF FEEDING CARDING ENGINES, THE CARDING PROCESS WITH PROBABLY THE HIGHEST POTENTIAL FOR DUST GENERATION CAN BE EFFECTIVELY CONTROLLED BY VENTILATION SYSTEMS AS CAN THE DRAWING OPERATORS.

THE CONFIGURATION OF THE MACHINERY OR FRAMES USED IN THE ROVING PROCESS DOES NOT EASILY LEND ITSELF TO DUST CONTROL BY LOCAL EXHAUST VENTILATION, HOWEVER, THIS PARTICULAR OPERATION IS NOT NORMALLY A HIGH DUST LEVEL GENERATOR AND VIRTUALLY ALL ROVING AREAS ARE WITHIN THE OSHA STANDARD WITHOUT ADDITIONAL EFFORT TOWARD DUST CONTROL.

PROCESSES IN THE YARN PRODUCTION PLANT SUBSEQUENT TO WHAT I HAVE CALLED FIBER PREPARATION PRESENT A DIFFERENT ENGINEERING PROBLEM FOR THE VENTILATION CONTROL OF DUSTS. THE MACHINES, OR FRAMES, THAT ACCOMPLISH SPINNING, TWISTING, SPOOLING, OR WINDING HAVE NOT, TO THIS TIME, BEEN RETROFITTED WITH LOCAL EXHAUST VENTILATION SYSTEMS. RATHER, DUST CONTROL HAS BEEN AFFECTED BY GENERAL DILUTION VENTILATION WHERE LARGE QUANTITIES OF ROOM AIR ARE DRAWN IN THROUGH AN AIR WASH UNIT AND RETURNED TO THE WORKPLACE. THE PRIMARY PURPOSE OF THESE AIR WASH UNITS IS TO CONTROL THE HUMIDITY AND TEMPERATURE IN THE PRODUCTION AREA. THEIR EFFICIENCY AS A DUST CONTROL MEASURE

IS VARIABLE, THEREFORE SOME OF THE YARN MANUFACTURING AREAS SUCH AS WINDING REMAIN OVER THE OSHA STANDARD. SPINNING ROOMS ARE USUALLY IN COMPLIANCE WITHOUT ADDITIONAL EFFORT TOWARD DUST CONTROL, HOWEVER, THERE ARE OF COURSE A FEW EXCEPTIONS TO THIS.

A POSSIBLE ENGINEERING ANSWER TO THE FEW CONTINUING DUST PROBLEMS IN THESE AREAS MAY BE TO UPGRADE THE DUST CAPTURING CAPABILITY OF THE AIR WASH UNITS WHICH WOULD RETURN CLEANER AIR TO THE WORKPLACE FOR DILUTION OF THE DUSTS.

A NUMBER OF DUST CONTROL CONCEPTS OTHER THAN VENTILATION CONTROL HAVE ARISEN ON THE MARKET THAT PROBABLY SHOULD BE MENTIONED. CHEMICAL TREATMENT OF FLOORS AND WALLS OF THE WORKPLACE TO ATTRACT AND RETAIN DUSTS, CHEMICAL ADDITIVES TO AIR WASH WATER TO CONTROL ION GENERATION, LOW VOLTAGE ELECTROSTATIC COLLECTION UNITS PLACED THROUGHOUT THE WORK AREA AND THE INSTALLATION OF MULTIPLE CEILING- HUNG AIR FILTRATION UNITS TO NAME A FEW. TO MY KNOWLEDGE, NONE OF THESE CONCEPTS HAVE SEEN WIDESPREAD USE AS A PANACEA FOR DUST CONTROL IN SPINNING, WINDING, SPOOLING, OR TWISTING AREAS ALTHOUGH SOME LIMITED SUCCESS HAS BEEN REPORTED IN CERTAIN INSTALLATIONS.

IT IS OUR COMPANY'S EXPERIENCE THAT 80-85% OF TEXTILE YARN MANUFACTURING AREAS ARE NOW IN COMPLIANCE WITH THE OSHA STANDARD. A NUMBER OF PLANTS HAVE ACHIEVED TOTAL COMPLIANCE ON ALL SHIFTS.

IT HAS ALSO BEEN OUR EXPERIENCE THAT KNITTING AND HOSIERY PLANTS HAVE BEEN AND REMAIN IN COMPLIANCE WITH THE STANDARD.

TO MY KNOWLEDGE, WEAVING DEPARTMENTS WITHIN INTEGRATED TEXTILE PLANTS AND WEAVE PLANTS OR CLOTH MILLS ARE GENERALLY WITHIN THE OSHA STANDARD. APPARENT DUST LEVELS THAT EXCEED THE STANDARD IN WEAVING USUALLY REFLECTS THE CONTRIBUTION OF LUBRICATING OIL MISTS AND/OR HIGH DISSOLVED SOLIDS CONTENT OF HUMIDIFYING WATERS. NEITHER OF THESE CONSTITUENTS OF AIRBORNE PARTICULATES CONTRIBUTE TO THE RISK OF BYSSINOSIS. UNFORTUNATELY, THE VERTICAL ELUTRIATOR PRESENTLY USED AS THE STANDARD FOR COTTON DUST MEASUREMENT IS NOT SPECIFIC AND ALL PARTICULATE MATTER IN THE LESS THAN 15 MICROMETER DIAMETER RANGE IS RECORDED AS PART OF THE SAMPLE.

2. PROGRESS MADE BY THE TEXTILE INDUSTRY TOWARD COMPLIANCE WITH THE COTTON DUST STANDARD.

THE EARLY EFFORTS TOWARD DUST CONTROL IN SOME TEXTILE COMPANIES BEGAN ABOUT THE TIME THAT THE OSHA STANDARDS WERE ISSUED IN 1970. THESE EARLY EFFORTS WERE DIRECTED MORE TOWARD LINT CONTROL THAN THE CONTROL OF THE FINE DUSTS THAT HAD BEEN SHOWN TO BE OF BIOLOGICAL SIGNIFICANCE.

IN 1978 THE EXPANDED VERSION OF THE COTTON DUST STANDARD FOCUSED ON THE FINE DUSTS AND DUST CONTROL TECHNIQUES DEVELOPED FOR A NEW APPROACH TO REDUCING WORKROOM LEVELS.

THE DEMONSTRATION OF PROGRESS TOWARD COMPLIANCE SINCE 1978 MAY BEST BE OBTAINED FROM OSHA COMPLIANCE RECORDS.

A QUICK SURVEY OF COTTON DUST SAMPLING DATA FROM OUR FILES WAS MADE THIS WEEK AND IS ATTACHED TO THIS COPY. THE DUST SURVEY RECORDS OF FORTY-FOUR COTTON TEXTILE YARN MILLS WERE REVIEWED FOR THE COMPARISON DUST LEVELS IN 1979 AND 1982. THESE FORTY-FOUR PLANTS YIELDED 528 SEPARATE WORK AREAS FOR WHICH AVERAGE DUST MEASUREMENTS WERE RECORDED IN 1979. 523 OF THESE SAME AREAS REMAINED AND WERE MEASURED AGAIN IN 1982.

IN 1979, 61.5% OF THE WORK AREAS WERE IN COMPLIANCE. IN 1982, 81.3% WERE IN COMPLIANCE. FIFTEEN OF THE PLANTS WERE IN FULL COMPLIANCE AT THE LAST SCHEDULED SAMPLING PERIOD.

THIS IS CERTAINLY NOT AN EXTENSIVE STUDY HOWEVER IT REFLECTS PROGRESS IN THE THREE YEARS AMONG THESE PLANTS WHICH WERE SELECTED FROM THE FILES OF OUR COMPANY.

3. PRODUCTIVITY AS AFFECTED BY THE COTTON DUST STANDARD AND AVAILABLE TECHNOLOGY:

IN THE PAST DECADE, EQUIPMENT AND PROCESS CHANGES HAVE TENDED TO INCREASE THE PRODUCTIVITY IN YARN AND CLOTH MANUFACTURING. AT THE SAME TIME, THESE YARN AND CLOTH MANUFACTURING PLANTS HAVE BEEN ACTIVELY CONTROLLING COTTON DUST EXPOSURES. BOTH ACHIEVEMENTS HAVE COME ABOUT ESSENTIALLY AS PARALLEL DEVELOPMENTS IN THE INDUSTRY. I AM QUITE SURE THAT DUST CONTROL PLAYED A PART IN THE ACCEPTANCES AND USE OF NEW PROCESSES AND EQUIPMENT, HOWEVER, THE PRODUCTION ADVANTAGE IN GOING TO THE NEW WAS NECESSARY FOR ACCEPTANCE. FOR EXAMPLE, NEW HIGH SPEED CARDS OF THIS DECADE HAVE CONSIDERABLY HIGHER PRODUCTION RATES GIVING THEM THE POTENTIAL FOR GENERATING HIGHER DUST LEVELS. HOWEVER, THE DESIGN OF THESE NEW CARDS IS SUCH THAT THE VENTILATION CONTROL OF FUGITIVE DUSTS IS FACILITATED AND THE RESULT IS LOWER EXPOSURE TO THE CARD TENDERS. SOME NEW CARDS HAVE DUST CONTROL SYSTEMS AS AN INTEGRAL PART OF THE DESIGN, READY TO BE EASILY CONNECTED TO A CENTRAL VACUUM SYSTEM OF THE PLANT. SINCE OLDER, SLOWER CARDS CAN ALSO BE ADEQUATELY EXHAUST VENTILATED FOR DUST CONTROL, IT IS NOT LIKELY THAT THEY WOULD BE REPLACED WITHOUT THE PRODUCTION ADVANTAGE.

THE MODERN METHOD OF CLEANING AND FEEDING RAW COTTON FIBER TO CARDS BY A PNEUMATIC TRANSPORT AND DISTRIBUTION SYSTEM HAS ELIMINATED THE NEED FOR THE PICKING PROCESS AND THE MANUAL HANDLING OF PICKER LAPS OR LARGE ROLLS OF COTTON FIBER. PICKING, A DUST PRODUCING OPERATION, CAN BE SUCESSFULLY RETROFITTED WITH

DUST CONTROL SYSTEMS. SO IT IS MY OPINION THAT THE DECISIONS THAT CHUTE FEED SYSTEMS FOR CARDS ARE FEASIBLE HAVE BEEN BASED PRIMARILY ON REDUCTIONS IN LABOR AND IMPROVEMENT IN UNIFORMITY AND QUALITY OF THE PRODUCT, WITH THE ELIMINATION OF A DUSTY PROCESS A SECONDARY CONSIDERATION.

OPEN END SPINNING HAS REPLACED TRADITIONAL RING SPINNING WHERE YARN STYLES AND QUALITY SUIT THIS NEW PROCESS. THE OPEN END SPINNING PROCESS WAS BEING DEVELOPED AS A PRODUCTION IMPROVEMENT BEFORE OUR RECOGNITION OF BYSSINOSIS AS A PROBLEM IN THE U.S. THE CONFIGURATION OF THESE MACHINES ALSO FACILITATES GOOD DUST CONTROL BY LOCAL EXHAUST VENTILATION METHODS MAKING IT GENERALLY A LESS DUSTY OPERATION THAN CONVENTIONAL SPINNING.

THE DECISIONS TO SWITCH TO OPEN END SPINNING BY SOME TEXTILE PLANTS ARE VERY LIKELY MADE FOR PRODUCTION REASONS BUT AT THE SAME TIME DUST PROBLEMS WOULD NOT BE INCREASED AND VERY LIKELY REDUCED.

SIMILAR INNOVATIONS HAVE BEEN MADE IN WEAVING DEPARTMENTS WHERE LOOMS OF NEW PRINCIPLE AND CONFIGURATION ARE REPLACING SLOWER FLY SHUTTLE LOOMS AND ALSO IN THE OPENING ROOMS OF YARN MANUFACTURING PLANTS WHERE MECHANICAL HANDLING OF RAW COTTON IS REPLACING MANUAL METHODS.

THE RATHER EXTENSIVE DUST COLLECTION AND FILTRATION SYSTEMS THAT ONE NOW SEES IN MOST TEXTILE PLANTS ARE IN MY VIEW, INSTALLED FOR THE PURPOSE OF REDUCING WORKPLACE DUST LEVELS AND DO NOT MEASURABLY CONTRIBUTE TO PRODUCTION LEVELS.

DUST STATUS OF COTTON PLANT WORK AREAS

	1979						1982					
	PREPARATION		YARN MFG.		OTHER		PREPARATION		YARN MFG.		OTHER	
PLANT #	C	NC	C	NC	C	NC	C	NC	C	NC	C	NC
1	3	2	3	1	0	1	5	0	4	0	1	0
2	2	3	6	0	0	1	5	0	6	0	1	0
3	1	14	4	2	0	1	9	6	6	0	1	0
4	0	5	6	0	1	0	1	4	6	0	2	0
5	7	1	3	0	1	0	8	0	3	0	1	0
6	9	5	13	3	3	0	14	0	16	0	3	0
7	7	1	4	1	1	0	7	1	4	2	1	0
8	2	5	8	0	1	0	6	1	8	0	1	0
9	3	3	9	0	2	0	6	0	9	0	2	0
10			4	4					8	0		
11			7	2					9	0		
12			4	0					4	0		
13	0	4	4	4	1	0	4	0	4	3	1	0
14	1	12	3	3	2	0	11	2	3	2	1	1
15	1	3	2	1	0	1	3	1	3	0	1	0
16	0	5	1	4			1	5	3	3		
17	3	1	3	2	0	1	4	0	3	2	0	1
18	1	3	3	0	1	0	4	0	3	0	1	0
19	0	5	5	0	10	1	5	0	5	0	1	0
20	0	4	5	0	1	0	0	4	5	0	1	0
21	1	2	6	2			3	0	7	1		
22	0	4	4	3	0	1	0	4	5	2	0	1
23	3	1	6	1	1	0	3	1	5	2	0	1
24	5	0	10	0	1	0	4	0	8	1	1	0
25	8	7	3	0	1	0	15	0	3	0	1	0
26	3	1	3	2	1	0	0	4	5	0	1	0
27	3	2	3	0	1	0	4	1	3	0	1	0
28	2	3	3	0	1	0	5	0	3	0	1	0

DUST STATUS OF COTTON PLANT WORK AREAS

	1979						1982					
	PREPARATION		YARN MFG.		OTHER		PREPARATION		YARN MFG.		OTHER	
PLANT #	C	NC	C	NC	C	NC	C	NC	C	NC	C	NC
29	4	7	17	10	1	1	2	5	14	13	2	0
30			2	0					2	0		
31			2	0					2	0		
32	5	0	3	0	1	0	3	2	3	0	1	0
33	4	0	2	0			4	0	2	0		
34			7	0					5	2		
35			5	0					5	0		
36			3	1					4	0		
37	3	4	2	2	1	0	6	1	4	0	1	0
38	3	2	5	0	1	0	4	1	5	0	1	0
39	0	4	3	0	1	0	4	0	3	0	1	0
40	2	3	0	2			3	2	1	1		
41	0	5	1	3	1	0	5	0	2	2	2	0
42	12	2	8	1	1	0	7	7	6	0	1	0
43	1	5	0	4	0	1	5	0	0	5	0	1
44	0	8	3	0	1	0	7	0	3	0	1	0
TOTALS	99	136	198	58	28	9	179	52	212	41	34	5
	235		256		37		231		253		39	

C - work areas in compliance

NC - work areas out of compliance

Mr. VOLKMER. Thank you very much, Mr. Lumsden.

Mr. Brooks.

Mr. BROOKS. Thank you, Mr. Chairman.

I am John Charles Brooks, the elected commissioner of labor in the State of North Carolina, and it is a real privilege for me to come before you today and the Subcommittee on Investigations and Oversight of the Committee on Science and Technology representing the people of North Carolina.

I might say at the outset that North Carolina has one of the State-administered occupational safety and health programs, 1 of 33 States and jurisdictions that do have State-administered programs, and I am also the State designee for the OSHA program for the State of North Carolina.

The State of North Carolina does not approach the administration of OSHA and the enforcement of the cotton dust standard from the perspective that we are going to protect the workers of the textile industry from byssinosis, whether it exists or not; but rather we approach the administration from the perspective that we do not think it is defensible, in fact, to doubt or deny that chronic byssinosis is linked to cotton dust exposure. We think that the evidence is overwhelming, and I think most people, although I have not had occasion to appear before this particular committee, we have appeared before other committees of the U.S. House of Representatives, and most persons now know that perhaps I am the foremost advocate of the existing cotton dust standards and that I continue to try to convince both labor and management that the standards that have been promulgated and are in force, or set into motion that will become ultimately effective in the spring of 1984, are very fair to provide adequate minimum levels of protection and a mechanism for affording that level of protection.

North Carolina has approximately 245,000 citizens employed in businesses which manufacture textile products. We estimate that, out of approximately 1,000 separate businesses, approximately 300 businesses in North Carolina, excluding knitting, are confronted with the challenge of complying with OSHA's standard for cotton dust. The cotton dust standard probably has a greater impact in the State of North Carolina than in any other State.

By the best calculation that we have been able to make, we have approximately 85,000 employees who actually work in plants that handle cotton fiber. Also, by the best of our estimates, this is out of a total national population working in cotton fiber of 150,000, or about 56 percent of the entire Nation's population dealing with this particular standard.

North Carolina's Department of Labor prepared a response that we filed May 4, 1982, to the advanced notice of proposed rulemaking published by the Occupational Safety and Health Administration Tuesday, February 9, 1982. The North Carolina Department of Labor believes that a general review of the cotton dust standard, 29 CFR 1910.1043, is premature by about 5 years, but that certain clarification is unquestionably needed.

One of the main areas of concern that OSHA must clarify, we believe, is the level of protection that is intended by the current standard. Our contention is that the standard must always offer full protection to the employees. Our response includes a discussion of an action level, the definition of washed cotton, and issues relating to tiering, medical surveillance, and wage retention.

Since 1978, the North Carolina Department of Labor has collected much employee data using the vertical elutriator as a sampling device for cotton dust. This data is presented for both textile and nontextile industries. Also included are estimated numbers of exposed employees and their job classifications, and we are submitting for the committee's use copies for all the committee members of the entire response to the advanced notice of proposed rulemaking that we submitted May 4, 1982.

Since the effective data of the cotton dust standard in March 1980, North Carolina OSHA has conducted 106 cotton dust inspections. Again, this is of the approximately 300 separate locations that our surveys have reflected in fact fall currently under the standard.

I might add that North Carolina is the only jurisdiction with either federally or State-administered OSHA programs at the current time that is conducting cotton dust enforcement inspections on a random selection basis. For one reason or another, all other States and the Federal Government have ceased such inspection activity.

Our 106 cotton dust inspections currently represent about 80 percent of all the cotton dust inspections that have been made in America thus far under the standard. We have little data pursuant to our inspections that would indicate the progress companies are making toward compliance with the standard, but our statistics do show if a citation was issued. They do not indicate in which area the citation applied nor how many areas of a plant were in compliance. However, our industrial hygienists who make these inspections for the Department of Labor have visited enough plants now to have a well-informed opinion of the textile industry's progress. They believe that well over 50 percent of North Carolina's cotton textile plants have a majority of their operations in compliance with the permissible exposure limits, the PEL's.

Total compliance with the permissible exposure limits is expected by March 1984 for the textile industry in the State of North Carolina. Since March 1980, we have issued 47 nonserious citations and 9 serious citations concerning overexposure to cotton dust, and I would add that the 9 serious citations have almost all been, if not all been, for the failure to use the required respirators as intermediate protection as personal protective equipment.

This indicates that many companies are already in compliance. To issue a serious citation, there must be overexposure to cotton dust and employees not wearing respirators. Because the number of serious citations is small, this implies that employees are being protected with respirators during the interim period of installing engineering controls.

Our industrial hygienists have prepared the material entitled "Control Technology" which we are submitting as attachment 1. This data is based upon their experience and judgment and information gathered from ventilation equipment companies such as Pneumafil and Bahnson. Dr. John Lumsden, from whom you just heard, was also contacted.

This information reiterates our belief that cotton dust levels can be controlled. I have been unable to find recent data concerning productivity rates in the textile industry. The North Carolina Department of Commerce indicated their productivity material is current only up through 1978. However, our industrial hygienists believe that productivity has not been adversely affected by the cotton dust standard. To our knowledge, no company has ceased doing business because of the standard or the enforcement of the standard.

The attached cotton dust questionnaire was mailed to 992 North Carolina companies on July 16, 1981, and we are submitting it as attachment 2. The companies were chosen based upon standard industrial classification and included all those companies in the State that we thought could possibly be using cotton.

We received 922 responses. Of those responses, 134 companies were exempt because of administrative or judicial stays of the cotton dust standard; 501 did not use cotton, and 287 did process cotton. Some companies left questions blank, and this explains why the numbers on the tally that we are also submitting of the responses do not necessarily consistently add up in every case.

We continued to receive responses into March 1982. While the questionnaire results have not been updated, this data gives a measurement as to the degree that North Carolina textile companies were in compliance with the standard as of late 1981. For every question, a large majority of the responding companies answered yes, indicating that they believed that they were in compliance.

There were 215 companies that had already monitored their airborne concentrations of cotton. In an attached table that has been provided to you, we are setting forth the percentage of companies that believed that their cotton dust levels were below the permissible exposure levels in prescribed areas.

These data contain a bias, we recognize, in that companies are inclined to report favorable results and that those companies with levels above the permissible exposure limits are least likely to admit it or even report anything at all to OSHA.

However, these figures do agree with the professional judgment of our industrial hygienists that a majority of firms that have been inspected are in compliance. I would add that from my personal visits in many plants over a period of 5½ years, I have witnessed a tremendous technological revolution essentially in the textile industry and would say that, simultaneously with getting in compliance with the cotton dust standard, this industry has retooled to the advantage, I believe, of the industry and the Nation to make it very competitive on an international basis. I think, simultaneously to complying with the standard, we are seeing a major retooling that will be reflected in productivity as well as profitability and that the industry has already demonstrated that the cost of compliance with this standard is manageable by the industry.

At this point, it is my own estimation, reviewing the industry in North Carolina, that well over half the industry is in compliance with the standard and will have very little difficulty complying with the full impact of the standard when it is fully effective in the spring of 1984.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Brooks follows:]

Report by John C. Brooks, N.C. Commissioner of Labor
to the Committee on Science and Technology,
U.S. House of Representatives
on Cotton Dust Control Technology
September 22, 1982

Since the effective date of the cotton dust standard in March 1980, North Carolina OSHA has conducted 106 cotton dust inspections. We have little data that would indicate the progress companies are making toward compliance with the standard. Our statistics show only if a citation was issued; they do not indicate in which area the citation applied nor how many areas of the plant were in compliance.

However, our Industrial Hygienists have visited enough plants to have a well-informed opinion of the textile industries' progress. They believe that well over 50 percent of North Carolina's cotton textile plants have a majority of their operations in compliance with the permissible exposure limits (PEL's). Total compliance with the PEL's is expected by March 1984.

Since March 1980, we have issued 47 non-serious citations and nine serious citations concerning overexposure to cotton dust. This indicates many companies are already in compliance. To issue a serious citation, there must be overexposure to cotton dust and employees not wearing respirators. Because the number of serious citations is small, this implies employees are being protected with respirators during the interim period of installing engineering controls.

Our Industrial Hygienists have prepared the material entitled Control Technology. (See Attachment 1.) This data is based on their experience and judgment, and information gathered from ventilation equipment companies such as Pneumafil and Bahnson. John Lumsden of ELB, Associates was also contacted. This information reiterates our belief that cotton dust levels can be controlled.

I have been unable to find recent data concerning productivity rates in the textile industry. The North Carolina Department of Commerce indicated their productivity material is current only up through 1978. However, our Industrial Hygienists believe that productivity has not been adversely affected by the cotton dust standard. To our knowledge, no company has ceased doing business because of the standard.

The attached Cotton Dust Questionnaire was mailed to 992 North Carolina companies on July 16, 1981. (See Attachment 2.) The companies were chosen based on Standard Industrial Classification and included all those companies in the state that we thought could possibly use cotton. We received 922 responses. Of those responses, 134 companies were exempt because of administrative or judicial stays of the cotton dust standard, 501 did not use cotton, and 287 did process cotton. Some companies left questions blank; this explains why the numbers do not consistently add up.

We continued to receive responses into March of 1982. While the questionnaire results have not been updated, this data gives a measurement as to the degree North Carolina textile companies were in compliance with the standard as of late 1981. For every question, a majority, and usually a large majority of the responding companies answered yes, indicating they believed they were in compliance.

There were 215 companies that had already monitored their airborne concentrations of cotton dust. The following table indicates the percentage of companies who believed their cotton dust levels were below the permissible exposure level (PEL) in a particular area:

Percentage of Companies Claiming Compliance With the PEL in 1981

Area	PEL in ug/M^3	% in Compliance
Opening	200	53
Picking	200	61
Carding	200	52
Drawing	200	63
Combing	200	61
Roving	200	81
Spinning	200	83
Winding	200	76
Twisting	200	80
Slashing	750	100
Weaving	750	96
Knitting	500	100
Waste Processing	500	85
Other	500	97

These data contain a bias in that companies are inclined to report favorable results, and that those companies with levels above the PEL are least likely to admit it or even report anything at all to OSHA. However, these figures do agree with the professional judgment of our Industrial Hygienists -- that a majority of firms that have been inspected are in compliance.

Attachment 1

Control Technology

Dust control is an integral part of today's textile industry. Through the retrofitting of old machinery or replacement with new cleaner machinery, dust control technology has been able to effectively reduce dust to acceptable levels. Dust control is now considered and engineered as part of new machine development. The new machinery has also reduced employee exposure by utilizing automation. The following is a brief description, by process, of dust control measures which North Carlina OSHA has seen to effectively control employee exposure to respirable cotton dust as measured by the vertical elutriator.

Process	
Opening	- Bale opening is still a manual process but exposures can be controlled by good general dilution ventilation. Cotton opening is now mechanically or pneumatically handled. This automation reduced the need for employee presence. This area is now cleaner and requires less manhours to accomplish the older, dustier method of manual cotton opening.
Picking	- Local exhaust ventilation is available and used when necessary to control dust from this process. Picking is eliminated in most textile operations with the use of "chute" fed carding machines (cards).
Carding	- Local exhaust ventilation is available and used to control dust from the older lap fed cards and the newer chute fed cards. Chute fed cards are more automated than lap fed cards. This also reduces employees' exposure. Carding represents what was once one of the dustiest processes in the textile industry. Through available effective dust control measures, this process is now in compliance in most textile operations with the 1984 cotton dust levels.
Drawing	- Local exhaust ventilation is available and used, mostly as a retrofit to current machinery, which brings this process into compliance with the 1984 cotton dust levels.
Roving, Spinning, Winding, Twisting, & Spooling	- Effective local exhaust ventilation is not available to control these processes. Good general dilution ventilation controls these exposures IF the processes preceeding roving are engineered to exposure levels below the 1984 cotton dust levels.
Cloth Manufacturing	- Good general dilution ventilation controls these processes to the 1984 cotton dust levels. This dust contains components that are added to the yarn and are not associated with byssinosis. Both old and new looms meet the required dust levels in most textile weaving operations.

North Carolina Department of Labor
Occupational Safety and Health Division
4 West Edenton Street
Raleigh, North Carolina 27601
(919) 733-4880

Correct address as necessary

COTTON DUST QUESTIONNAIRE

INSTRUCTIONS: Please read each question completely and then indicate your answer by placing an X in the appropriate blank for that question.

Does your company use, handle, store or process cotton fiber or yarn including cotton blends? (If the answer is yes, complete the rest of the questionnaire. If the answer is no, STOP and return this questionnaire.) exempt 134 10			287 yes	501 no
How many employees work in this establishment? 11	62 50 employees or less	56 51-150	45 151-250	128 251 or over
How many of these employees are exposed to cotton dust? (regardless of the levels) 12	84 50 employees or less	49 51-150	51 151-250	100 251 or over
MONITORING 1910.1043(d) Has your company monitored the airborne concentrations of cotton dust to which employees are exposed in all areas of the plant and on all shifts? 13			215 yes	71 no

To what range of respirable dust in micrograms per cubic meter of air ($\mu g/m^3$) are your employees exposed? (Check one range per operation and only those operations existing in your plant.)

	200 $\mu g/m^3$ or less	201-500 $\mu g/m^3$	501-750 $\mu g/m^3$	750 $\mu g/m^3$ or more
opening 14	74	46	6	13
picking 15	46	22	5	3
carding 16	74	57	5	7
drawing 17	91	46	5	3
combing 18	45	27	1	1
roving 19	109	21	2	2
spinning 20	120	24	0	0
winding 21	122	37	2	0
twisting 22	63	15	0	1
slashing 23	25	28	1	0
weaving 24	29	35	7	3
knitting 25	13	8	0	0
waste processing 26	43	42	6	9
(specify________________) other 27	73	29	3	0

Have employees been notified in writing of monitoring results? 28	198 yes	53 no

Which of the following conducted the exposure monitoring initiated by your company?	29	3 government agency	110 company personnel	73 private consultant

METHODS OF COMPLIANCE 1910.1043(e)

Have you installed ventilation systems or other engineering controls specifically to reduce employee exposure to cotton dust?	30	189 yes	83 no
Do you plan to install ventilation systems or any other engineering controls to reduce employee exposure to cotton dust?	31	147 yes	107 no
Do you have a written plan which describes how and by what date employee exposures to cotton dust will be reduced using engineering controls?	32	156 yes	94 no
Is this plan ready for submittal to NC-OSHA if requested?	33	160 yes	82 no

RESPIRATORY PROTECTION 1910.1043(f)

Do employees in your establishment wear respirators where over exposed and during blow down for protection against cotton dust?	34	218 yes	47 no
Does your company have a written respirator program as required by 1910.134(b)?	35	201 yes	65 no

WORK PRACTICES 1910.1043(g)

Does your company have a written program of work practices established to reduce employee exposure to cotton dust?	36	201 yes	69 no

MEDICAL SURVEILLANCE 1910.1043(h)

Have all employees who are exposed to cotton dust been provided with medical examinations which include pulmonary function tests?	37	193 yes	76 no
Is this data ready for review and evaluation by NC-OSHA?	38	195 yes	64 no
Are medical exams provided to new employees prior to initial assignment?	39	187 yes	79 no

EDUCATION AND TRAINING 1910.1043(i)

Does your company have a training program which informs employees of the hazards associated with exposure to cotton dust and the steps to be taken to reduce their exposures?	40	202 yes	68 no
Are copies of the OSHA cotton dust standard and its appendices posted?	41	205 yes	60 no

SIGNS 1910.1043(j)

Are warning signs posted where required?	42	190 yes	57 no

Company representative completing this form (Please print or type)

______________________ (name)

______________________ (title)

______________________ (telephone number)

______________________ (date)

Mr. VOLKMER. Thank you, Mr. Brooks.

Dr. Ruttenberg.

Dr. RUTTENBERG. Thank you.

My name is Ruth Ruttenberg. I am senior associate in the economic consulting firm of Ruttenberg, Friedman, Kilgallon & Associates. I was formerly senior economist in the Occupational Safety and Health Administration. I am currently under contract from the Office of Technology Assessment to identify the relationship, if any, between new textile machinery technology currently being put in place in the industry and progress that these same mills are making in complying with OSHA cotton dust regulations.

It is important to note that I am still in the process of researching the subject, and none of the tentative results that I will discuss this afternoon have as yet been reviewed by OTA.

I would like to reemphasize the point that Mr. Lumsden and Mr. Brooks have made, that there seems to be almost a revolution in the textile industry in terms of the new technology which has come into place especially the last 8 to 10 years, but really in the last generation; and that in many cases companies are already in compliance with the OSHA standard. Industry spokesmen give me rules of thumb around 75 percent compliance. J. P. Stevens is saying that it is already 87 percent in compliance 2 years before the standard is in effect.

In those plants which have undergone heavy modernization, most of them say that they are either 100 percent in compliance or that, except for their wasteroom, they are 100 percent in compliance, or that they are nearly 100 percent in compliance. If we look at places where modernization has taken place, the North Carolina figures of over 50 percent compliance become quite conservative.

Many people, have tried, with various OSHA standards, to establish whether or not there is a clear simple relationship between regulation and technology—whether there is technology forcing, so to speak. I would like to just suggest from the beginning that while it is a fascinating exercise to search for a simple and causative relationship that it is not a very useful one. The kinds of investment decisions that companies make when they involve millions of dollars are clearly very complex decisions that deal with a company's profit levels debts and working capital. They deal with interest rates and they deal with legislation that is passed here on the Hill, like the Capital Recovery Act or the Economic Recovery Act of 1981. These investment decisions also deal with a whole variety of technological issues, like what technology is available, what kind of technology the competition has in place, and what kinds of changes the new technology will make in such areas as energy expenditures or product quality.

So what I am going to talk about is the timing of capital improvements to meet the cotton dust regulation which has been simultaneous with modernization. Compliance and modernization have in many uses occurred together. Whether or not the effect has been causative is, I think, much more difficult to establish.

There have been, according to the Department of Commerce, in the last 15 to 20 years, major textile machinery developments. What is described as a technological explosion has virtually swept across the entire major processing categories. It has been documented time and time again in Federal documents that this textile industry technology is being put in place by industry. Given this documentation it is strange to me that OSHA's consultant, back in the early 1970's, Research Triangle Institute, RTI, when they studied the potential regulatory impact of a proposed cotton dust rule, practically ignored technological developments which would involve new engineering controls. Instead, they focused their analysis on the cost of compliance through retrofits, enclosures, and add-on ventilation.

While certainly a large amount of compliance has gone the route of retrofits, enclosures, and add-on ventilation, a very large amount of compliance has also gone on, as we have already heard in testimony, through integral engineering designed into new equipment that is being put in place in the textile industry, and that is what I would like to focus on right now.

In 1981 the U.S. purchase of textile machinery was $1.6 billion. Modernization accounted for over 70 percent of those expenditures, which means that we have a very heavy amount of new capital investment going on in the textile industry. Shuttleless looms, chute-fed cards, open end spinning, and other techniques currently a major part of the modernization were well known if not widely used in the 1970's. Why did OSHA analyses nearly ignore them? Not only do these techniques bring compliance, but other benefits as well. Increasingly, yarn and cloth quality are increased; speed and efficiency of production are increased; our ability to meet foreign competition is increased; and decreasing is downtime, daily maintenance by manual labor by workers who would be exposed to cotton dust; as well as quantity of product seconds; labor turnover and absenteeism.

To ignore the role of technological change in any analysis of the textile industry I believe would be faulty. The textile industry, largely due to its new capital investments, is leading U.S. manufacturing in productivity growth. It was astounding to me to realize that during the period 1948 to 1979, textile manufacturing had the highest productivity growth rate of the 19 major manufacturing categories in SIC categories 20 to 38, which represent the manufacturing sector. At an average increase of 4.87 percent a year, it led chemicals, petroleum refining, electronic equipment, and all those manufacturing sectors which we tend to think of as the leaders in productivity growth. Its 4 percent annual increase during the recession of 1981 is high above the national average of just over 2 percent. Some mills, Burlington and Cone Mills among them, have been boasting 6 percent annual average productivity increases for their entire mill structure, not just for individual plants.

So what we have is, whether caused by the cotton dust regulation or in some way the cotton dust regulation being involved, or independently, very high productivity growth relative to the rest of the U.S. economy going on in textiles.

What is the industry saying about modernization and productivity? *Textile World*, a year ago, carried a headline, "Mill Installations Fulfill Claims for Less Labor, Lower Supply Costs, Reduced Dust and Higher Quality."

The modernization effort began most seriously in 1977, coinciding, perhaps coincidentally, with the promulgation of the OSHA cotton dust rule. By industry estimates, over $11 billion was spent from then through early 1981. Another $23 billion or so is expected to be spent in the textile industry by 1990. More technological progress in the textile industry is pending for the future, including the use of sophisticated new electronics and sophisticated microprocessors.

These simultaneous increases in productivity and cotton dust control have been achieved in many areas of cotton textile production—most especially as has been discussed already, in opening and picking, carding, spinning, and weaving.

I would like to look at each of these categories very briefly. The major step forward in opening and picking is in the installation of automatic equipment in cotton opening rooms to replace manual feeding. Automatic bale plucking systems have been part of the industry since the mid-1960's. The carousels and automatic feeders used, which pick off of several bales at once, have the following advantages: they pick faster; they create a more intimate blend of cloth because the carousels can pick off of several bales at once; they bypass the manual picker and the related backbreaking work; and they eliminate some of the dustiest work of the production process. In other words, higher productivity and better dust control are achieved at the same time.

In carding, the use of chute-fed cards encloses the process and removes the necessity for manual carding and for most manual cleaning. The chute-feeding system has been established since the 1960's. This technique can mean the elimination of doffing and racking; the elimination of the manual transport of materials to the card room and hanging the material onto cards and later into feed rolls. There is also an improvement in yarn because the automatic process on feed rolls reduces heavy places in the yarn; more than doubling of speeds in some cases; improvement in the settings on cards; better integration of fibers; reduced requirements for floor space; as well as reduced dust exposure due to both the enclosure of the cards and the reduction of hand-cleaning of those cards. Again, cotton dust is being controlled at the same time that productivity is being increased.

In spinning, for increasing numbers of production processes where open end spinning is being used, according to a Department of Commerce study in the 1960's, there has been a lot of progress being made. While open end spinning is not applicable to all production processes, where it has been, the roving process is eliminated, and in some cases two drawing processes can be eliminated as well. This increases productivity. The elimination of dust occurs in large part because the process is enclosed. Also because the machinery itself is very sensitive, and in order for the machinery to operate effectively, dust has to be controlled. There was, even from the OSHA hearings in 1977, substantial evidence that dust levels come down to a large degree when open end spinning is used.

In weaving, completely new technology began emerging in the mid-1950's, and this is perhaps one of the major changes going on in the textile industry right now. Many experts believe by 1990 there may be a 90-percent shift from shuttle looms into shuttleless looms. Shuttleless looms bring many advantages to textile plants. Productivity is increased, sometimes by as much as three times.

The cloth from shuttleless looms can have greater width, thus giving the textile industry greater versatility in terms of how it produces its products. The shuttleless looms are also quieter, which helps with compliance in another OSHA problem area. Temperature and humidity control are improved, which increases the quality of the cloth as well as the work environment. Traveling cleaners on the equipment take care of most of the dust problems at the source.

So what we have is, through these major areas of textile manufacturing—and one could also talk about automatic cleaning systems and humidity controls, and so on—we have simultaneously, where these new technologies are being put in place, both productivity increases and also dust control.

I would like to point out that some of the dust control has been necessitated not only by OSHA regulation to protect workers but also by the sensitivity of new, more sophisticated equipment to dust. Lower machine tolerances have led to cotton dust controls, ones which often improve productivity as well.

Let me just briefly mention a few of the statements that have come from individual companies on the subject of simultaneous compliance and productivity achievements. Springs Industries, the textile company which many stock exchange analysts have identified as the likely leader in 1982 economic performance; the only textile company that Value Line, for example, says will lead the stock market in 1982—claims that:

> Over the last several years, we have increased productivity while improving the work environment in our plants. We are installing new machinery that enables Springs' people to produce greater volume per person, and we are phasing out obsolete facilities. New high-speed machines in one plant are three times as productive as the machines they replaced.
>
> In another plant area, new shuttleless looms are more than twice as productive as the conventional shuttle looms they replaced. Modernization of yarn manufacturing resulted in better quality yarn, improving weaving efficiency and a higher percentage of first quality cloth.

Springs Industries, as far back as 1977, was using chute-fed card systems at its Frances plant in Fort Lawn, S.C., and was saving $45,000 a year in labor costs alone. In addition, the company said that it was getting evener motions on card fronts; it was getting closer tolerances with its cards; was improving quality throughout the plant; thick-thin places and chokes were eliminated; and, in addition, dust and lint were confined within the chutes, therefore maintaing a much cleaner inplant environment.

I could go through a number of other companies' statements, some of which are included in my written testimony. The list could go on and on of improvements that individual plants have made, including some companies that say they save a quarter of a million dollars a year as a result of new productivity improvements which were in many ways motivated by the OSHA cotton dust standard.

There is one very thorny problem in looking at all of this that I think deserves mention. What part of all this new technological improvement should be considered a result of OSHA cotton dust regulation? How do you determine the specific capital expenditures for OSHA compliance? This very tough issue must be addressed constantly when there are big headlines that OSHA compliance costs $1 million here or $5 million somewhere else.

The most used index for determining compliance costs is the McGraw-Hill survey, which is based on expenditure levels for compliance, supplied directly by companies. In the textile industry it is hard to know, if possible at all, whether automatic picking, chute-fed cards, open-end spinning, shuttleless looms, or in fact traveling cleaners, air-conditioning and humidity control expenditures were installed due to regulatory pressure alone or also as part of efforts to improve corporate productivity. If the investments accomplish a multitude of goals, what percent of the expenditures should be allocated to OSHA compliance?

I have yet to talk with any industry spokesmen who have been able to say to me that they can really, honestly make clear distinctions when new technology is involved between what percent ought to be allocated to the OSHA regulation and what percent ought to be allocated elsewhere.

When asked about OSHA compliance costs at a Fieldale, Va., towel plant in 1980, Fieldcrest's Ken Baggett said he could not even say how much was spent because new equipment increased productivity, offsetting some of the cost.

Another industry spokesman, while he believed that large amounts of funds had been diverted due to OSHA, readily admitted that once his company went to work on dust abatement efforts, they are going to mess with the machine. They are going to, as he said, "fool with the damned machine" to improve cloth quality or productivity in one way or another, because as long as they are changing the engineering, they are going to get other benefits from that retooling.

Still another industry official explained that his company had been wanting to make new capital investments for some time and that the cotton dust regulation pushed that company into the decision in a more timely fashion.

The Commerce Department did a lengthy study, published in 1980, on technology forcing and concluded that the U.S. Occupational Safety and Health Administration's dust regulations have had a dramatic effect on short staple processing equipment design and purchasing, that machine suppliers modified equipment to comply with OSHA regulations, and that this equipment has been accepted on a worldwide basis as well as in the United States.

The British magazine *Economist* in 1980 gave part of the credit for the economic comeback in the U.S. textile industry to tougher U.S. Government regulations which they said unexpectedly gave the industry a leg up by pushing it into new investments.

It is just possible that the OSHA cotton dust regulation occurred at a good time in the process of textile industry modernization. Clearly, the industry should be congratulated for the important strides that it has made in moving forward in modernization and in leading the country in productivity growth.

Many elements of machine design which could aid in solving problems of OSHA compliance were recognized and incorporated into new equipment for reasons that may have had to do with the existence of Government regulation itself. Of all modes of compliance, designed-in engineering controls are preferred. They control both more effectively and more efficiently.

The U.S. economy is still in the midst of a serious recession, as we all know; but textile industry productivity growth still leads the manufacturing sector. Some would argue that the OSHA cotton dust rule helped to spur new productivity-increasing modernization in the textile industry. Most would agree, at least, that whatever the reasons, the textile industry has been solving the cotton dust problem and increasing its productivity simultaneously.

I thank you for the opportunity to appear before this subcommittee. My fuller report to OTA, which will be done later this year, will further discuss many of these issues.

[The prepared statement of Dr. Ruttenberg follows:]

TESTIMONY OF DR. RUTH RUTTENBERG
BEFORE THE
SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT
OF THE
HOUSE COMMITTEE ON SCIENCE AND TECHNOLOGY

SEPTEMBER 22, 1982

Mr. Chairman, Members of the Committee,

Thank you for the privilege of appearing before you today. My name is Dr. Ruth Ruttenberg. I am senior associate in the economic consulting firm of Ruttenberg, Friedman, Kilgallon & Associates. I was formerly senior economist in the Occupational Safety & Health Administration. Currently, I am under contract from the Office of Technology Assessment (OTA) to identify the relationship, if any, between new textile machinery technology currently being put in place in U.S. textile mills and progress that these same mills are making in complying with the OSHA cotton dust regulations. It is important to note that I am still in the process of researching this subject and none of the tentative results which I will discuss this afternoon have as yet been reviewed by OTA.

Many people have tried to establish a clear, simple and causative relationship between regulation and technology. While this could be a fascinating exercise, it is not very useful since the decision by a firm to try new innovative techniques is usually the composite result of examining many factors.

There are the general considerations of any investment decision: What are the profit levels of the company? The debt structure? The amount of working capital? What are the applicable interest rates? What useful life, if any, is there to existing capital? What economic life? What is the competition doing, etc.? Financial investment decisions may also be affected by such federal legislation as the 1981 Capital Recovery Act or the 1981 Economic Recovery Act.

Then there are also considerations much more specific to the technology itself. These include: What new technology is available? How will it affect costs, profits, product quality, energy expenditures, etc.? How well tested are the techniques involved? What kind of machine servicing is available? How soon could this new generation of equipment itself become out-of-date? And, increasingly through the 1970s, how will this equipment help in compliance with government regulations?

All of these questions and more are relevant to the issues of modernization in the textile industry. Regulation may well be an important consideration in an investment decision. It is not likely to be the sole consideration. The most effective investments usually achieve multiple goals, regulation being but one. A 1980 Commerce Department study found that while U.S. companies through the 1970s were not modernizing as quickly as overseas competitors, that great strides were being made, and that the possibilities were vast. During the last 15 to 20 years, they found that "textile machinery developments have undergone what is described as a technological explosion [which] has virtually swept across all major processing categories." How strange that RTI, the OSHA consultant which studied the potential regulatory impact of a proposed cotton dust rule in the 1970s practically ignored new technological developments in its study, and focussed technological and economic analysis primarily on compliance through retrofits, enclosures and add-on ventilation. By 1981, the U.S. purchase of textile machinery was $1.6 billion per year. Modernization accounted for over 70 percent of those expenditures. Shuttleless looms, chute-fed cards, open-end spinning, and other techniques currently a major part of the modernization process were well known, if not widely used in the 1970s. RTI's high cost estimates for compliance with OSHA did not recognize the degree to which many expenditures for OSHA compliance would also help to modernize the textile industry -- increasing simultaneously yarn and cloth quality, speed and efficiency of production and foreign competitiveness; decreasing downtime, daily manual maintenance, quantity of product seconds, labor turnover and absenteeism, etc.

To ignore the role of technological change in any analysis of the U.S. textile industry would be faulty. The textile industry, largely due to its new capital investments, is leading U.S. manufacturing in productivity growth. During the period 1948-1979, textile manufacturing had the highest productivity growth rate of the 19 major manufacturing categories, SIC 20-38. At an average increase of 4.87 percent, it led chemicals, petroleum refining, electronic equipment, etc. Its four percent annual increase during the recession of 1981, it is high above the national average of just over two percent. And some mills, Burlington among them, have been boasting six percent average annual increases for several years.

In the words of the Daily News Record of June 7, 1982:

> "The textile industry as a whole has made the hard decisions to invest in productivity improving capital assets; to scrap obsolete plants, and to forego income in the short run in order to capitalize on the future."

What are the results of this modernization? Textile World a year ago carried a headline:

> "Mill installations fulfill claims for less labor, lower supply costs, reduced dust and higher quality."

The modernizing effort began seriously in 1977 (coinciding, perhaps coincidentally, with promulgation of the OSHA cotton dust rule). Over $11 billion was spent from then through early 1981. Another $23 billion or so is expected to be spent by 1990. More technological progress in the textile industry is pending for the future, including the use of sophisticated new electronics and sophisticated microprocessors.

These simultaneous increases in productivity and cotton dust control have been achieved in many areas of cotton textile production. I will briefly discuss four of these: opening and picking, carding, spinning, and weaving:

Opening and picking. The major step forward in this part of the plant is the installation of automatic equipment in cotton opening rooms to replace manual feeding. Automatic bale plucking systems have been part of the industry since the mid-1960s. The carousels and automatic feeders used, which pick off of several bales at once have the following advantages:

a) faster picking;

b) a more intimate blend of cloth because carousels can pick off of several bales of cotton at once;

c) bypassing the manual picker and the related backbreaking work; and

d) eliminating some of the dustiest work of the production process.

Carding. The use of chute-fed cards encloses the process and removes the necessity for manual carding and for most manual cleaning. The chute-feeding system to the cards has been established since the late 1960s. This technique can mean:

a) The elimination of doffing and racking.

b) Elimination of the manual transport of materials to the card room and hanging the material onto cards and later into feed rolls.

c) Improvement in yarn because the automatic process on feed rolls reduces heavy places in the yarn.

d) More than doubling of speeds in some cases with metallic clothed card instead of flexible cards.

e) Improvement in the settings on cards due to roller bearings on cylinder supports because settings can be closer. This leads to more even clothing with closer tolerances.

f) Better integration of fibers resulting in a more uniform and stronger piece of yarn.

g) Reduced requirements for floor space.

h) Reduced dust exposure due to enclosure of cards.

i) Reduced dust exposure because hand cleaning of cards, once done twice a day, can be reduced to once a week.

Spinning. For increasing numbers and types of yarn production, there has been a shift from the conventional ring spinning to open-end spinning. According to a lengthy Department of Commerce study, open-end spinning has been commercially accepted since the mid-1960s. While open-end spinning may never be the preferred method for all spinning operations, where applied, it has been responsible for many improvements:

a) The roving process is eliminated and, in some cases, two drawing processes, breaker and finisher, can be eliminated as well.

b) Some elimination of dust occurs because the process is enclosed. In addition, open-end spinning is more adaptable to the installation of local exhaust ventilation than is ring spinning. Testimony at OSHA hearings in 1977 presented a reduction in one plant from 780 to 170 ug/m^3 when it converted to open-end spinning. ndustry reported reductions ranging from 690 to 210 ug/m^3.

Weaving. In weaving, completely new technology began emerging in the mid-1950s. One of the major changes in textile manufacturing equipment currently underway, especially in the U.S., is the shift from shuttle to shutteless looms. Some experts expect that 90 percent of existing mills will have converted to shuttleless looms by 1990. These looms bring many advantages to textile plants. Among them:

a) Productivity with some shuttleless looms is as much as three times what it is with conventional shuttle looms.

b) The cloth can have greater width, with speed, marketing and quality advantages.

c) Shuttleless looms are far quieter, bring noise levels potentially within the OSHA standard.

d) Temperature and humidity control, demanded by the sensitivity of the machinery, improve the work environment and the cloth quality.

e) Traveling cleaners on the equipment take care of more dust problems at the source.

These technological changes in textile plants during the past few years have changed the process manufacturing of the industry in the following ways:

1) A continuous manufacturing process flow, in place of an intermittent one.
2) A large reduction in the number of processing steps and the number of pieces of equipment, along with a major increase in machinery speed.
3) A gradual shift in job content; from requirements for manual skills to those requiring electro/mechanical skills.

In addition, management efficiency is improving, inventory control is more effective, energy-efficiency has improved substantially and the cotton dust problem is easing significantly.

Some of the dust control has been necessitated not only by OSHA regulation to protect workers, but also by the sensitivity of new more sophisticated equipment to dust. Lower machine tolerances have led to cotton dust control techniques, ones which often improve productivity as well as increasing the useful life of the equipment.

Spinning frame cleaners, which prevent accumulation of lint about the drafting area and on sides of spring frames improve frame efficiency and yarn quality. Roving frame cleaners prevent lint accumulation, an otherwise frequent cause of frame stoppages. The lint generated by modern high speed drawing has brought about the development of automatic travelling cleaners for drawing frames. These cleaners can improve sliver quality and reduce down time for manual cleaning. Avoiding manual cleaning saves workers from dangerous exposure. It also saves severe production losses since down time is increasingly expensive, with the speed of modern drawing frames at least three times the level of older models. These cleaners have all existed since the 1950s.

Open-end spinning has rotors which are very sensitive to micro-dust and require good cleaning equipment. One technological solution is the use of tandem carding. Besides increasing productivity, providing more intimate yarn blends, and being more energy efficient, Crossrol, producer of one tandem carding system, has this to say in its advertising:

> "Reduced dust and micro-dust produces the cleaner sliver essential for troublefree open-end and ring spinning. Reduces dust emission at every step from carding through weaving for easier OSHA compliance."

Some experts believe that high humidity is, in large part, responsible for high cotton dust levels in plants. Humidity control, therefore, would also bring with it cotton dust control. But humidity control is also critical for efficient textile mill operations, especially in the more modern plants. Benefits include increased production, improved product quality, reduced waste and generally more comfortable working conditions.

Here are some examples of what specific companies have said about changes in their industry:

-- Springs Industries, the textile company that stock exchange analysts have identified as the likely leader in 1982 performance, in their 1981 annual report:

> Over the last several years, we have increased productivity while improving the work environment in our plants. We are installing new machinery that enables Springs' people to produce greater volume per person, and we are phasing out obsolete facilities. New high-speed machines in one plant

> are three times as productive as the machines they replaced...In another plant area, new shuttleless looms are more than twice as productive as the conventional shuttle looms they replaced...Modernization of yarn manufacturing resulted in better quality yarn, improved weaving efficiency and a higher percentage of first quality cloth.

-- Springs Industries as far back as 1977 was using a chute-fed card system at its Frances plant in Fort Lawn, South Carolina, and was saving $45,000 a year in labor costs and also, according to a report in Textile World:

> "evener motions at card fronts maintain sliver-weight levels within close tolerances and improve quality throughout the plant...thick-thin places and chokes...have been eliminated...Another benefit is that the system itself keeps dust and lint confined within the chutes, therefore maintaining a much cleaner in-plant environment."

-- George Hightower, Jr., Vice President of Georgia-based Thomaston Mills, said last year.

> "Taking advantage of modern technology will enable us to lower costs and boost productivity, while improving our quality. Moeover, the carding program should bring us into compliance with OSHA dust regulations."

-- Union Underwear's Yarn Division in Alabama installed chute-fed systems in 1978 and they have since reduced labor costs, improved quality and efficiency and made significant improvements in absenteeism and labor turnover. The card rooms now meet OSHA dust standards.

-- At Opp and Micolas Mills in Alabama, new chute-fed systems save $250,000 a year and meet the OSHA dust level standards.

-- Fred Corriher, Jr. President, Linn-Corriher Corporation, in discussing a $3 million investment which led to OSHA compliance in all but the plant's waste room, told the Charlotte Observer in 1980 that the new equipment, replacing machinery 40 to 50 years old, increased efficiency.

-- G. Stephen Felker, President and Treasurer of Georgia's Walton Mills spoke this month about the near completion of a $10 million, four-year modernization program. The program, he said, should meet current government regulations and should produce better quality yarns and fabrics.

-- American Dornier Machinery Corporation, in a letter to me this month, said, "...The Dornier Weaving Machine meets or exceeds OSHA and EPA requirements in regard to health and safety." They went on to explain several productivity improvements that their equipment provides. These include:

> "...New gearboxes for optimal rapier acceleration...with less wear.
>
> "...Technical improvements to reduce thread breakage frequency...
>
> "...Reduced down time due to threat breakages.
>
> "...Time needed for style changes, maintenance, etc...reduced."

The list could go on and on.

The U. S. textile industry, in its brief before the Supreme Court in 1980 challenging the OSHA cotton dust standard, never denied that the standard was technologically feasible. They said, "The question of the standard's technological feasibility per se is not before the Court at this time." They argued instead against economic feasibility. Major reliance on retrofits, enclosures and add-ons, as RTI had predicted, would indeed have diverted enormous amounts of investment funds into compliance without concurrent gains in productivity. In large part, the story has unfolded differently and the diversion of capital to OSHA compliance has usually been simultaneously a use of capital to increase a company's efficiency, product quality, and overall competitiveness. To the extent that new investment and higher productivity are encouraged, we experience the best in what has been called "technology-forcing regulation."

A further word about determining capital expenditures for OSHA compliance is in order. Most used as an index is the McGraw Hill Survey, based on expenditure levels for compliance supplied by the companies. In the textile industry, it is hard to know, if possible at all, whether automatic picking, chute-fed cards, open-end spinning, shuttleless looms, or in fact traveling cleaners, air-conditioning and humidity control expenditures were installed due to regulatory pressure alone or also as part of efforts to improve corporate productivity. And if the investments accomplish a multitude of goals, what percent of the expenditure should be allocated to OSHA compliance? When asked about OSHA compliance costs at a Fieldale Virginia towel plant, in 1980, Fieldcrest's Ken Baggett said he could not even say how much has been spent because new equipment increases productivity, offsetting some of the cost. Another industry spokesman, even though he believes that large amounts of funds have been diverted due to OSHA, readily admits that the dust abatement effort is not purely that, and if a company is going "to fool with the damned machine, they also want to increase quality or" some other aspect of production. Still another industry official explained that his company had been wanting to make new capital investments for some time and that the cotton dust regulation pushed them to make the decision in a more timely fashion.

Technology-forcing aspects of the cotton dust regulation have been acknowledged by government study. A lengthy Department of Commerce study found:

> "The U. S. Occupational Safety and Health Administration dust regulations have had a dramatic effect on short staple processing equipment design and purchasing. Machine suppliers modified equipment to comply with OSHA regulations and this equipment has been accepted on a worldwide basis as well as in the USA. The dust controls have also contributed to much better operating results..."

The British Economist magazine in December 1980, in discussing the comeback of the U.S. textile industry, claimed that:

> "Tougher government regulations on workers' health have, unexpectedly, given the industry a leg up. Tighter dust control rules for cotton plants caused firms to throw out tonnes of old inefficient machinery and to replace it with the latest available from the world's leading textile machinery firms..."

It is possible that the OSHA cotton dust regulation occurred at a good time in the process of textile industry modernization. Many elements of machine design which could aid in solving problems of OSHA compliance were recognized, and incorporated into new equipment. Of all modes of compliance, designed-in engineering controls are preferred. They control both more effectively and more efficiently.

The U. S. economy is still in the midst of a serious recession, but textile industry productivity growth still leads the manufacturing sector. Some would argue that the OSHA cotton dust rule helped to spur the new productivity-increasing modernization in the textile industry. Most would agree at least, that whatever the reasons, the textile industry has been solving the cotton dust problem and increasing its productivity simultaneously.

I thank you again for this opportunity to appear before you. My fuller report for OTA, when completed, will further discuss and document these important issues of technology-forcing and regulation.

Mr. **Volkmer**. Thank you very much, Dr. Ruttenberg.

Mr. Thackston.

Mr. **Thackston**. Thank you, Mr. Chairman. We appreciate this opportunity to make comments before the committee.

We have been asked to testify on dust control technology, more specifically, two points: We were asked to discuss the available technology for controlling cotton dust levels in the textile industry and the effect of new dust control technology on productivity in the industry.

Significant improvements have been made in modern, high-production textile processing systems that separate trash, dirt, and foreign matter from the cotton fibers in the processes involved in converting the fiber to sliver or roving. General emphasis by the machinery and equipment builders on cleaning the cotton in the processes up through the card room and including carding, drawing, lap winding, combing and roving, have resulted in eliminating much of the dust in the early stages of manufacturing yarn.

Along with the progress made by the machinery builders, there has been improvement in the technology applied by designers of engineered dust abatement systems. This increased technology falls into four general areas: improvements in the capture techniques at the point of dust release from the processing equipment; improvements in the transport or pneumatic conveying systems; and improvements in the filter trains that separate the waste fiber and dust from the suction cleaning air systems; and improvements in handling and disposing of the separated waste fibers and the dust.

Technology is presently available for controlling dust from opening through the card room by use of modern machinery and equipment. The costs of accomplishing this, which are quite extensive, I will cover in just a minute. The risk of noncompliance is low where new opening and cleaning with automated stock feeding through cutes to enclosed cards is possible and new engineered dust abatement systems are applied. Major expenditures in this area in recent years by the mills have met with good results.

However, for those mills with older equipment such as handfed opening, less efficient cleaning, conventional two beater pickers and typical medium production cards, the risk of noncompliance is high regardless of how well-designed the dust system may be. In these mills, the actions of the workers and the work practices themselves cannot always be overcome by existing technology used in the dust abatement systems. In order to insure compliance, it requires an investment in both new production machinery and dust control equipment. Compliance is very capital-intensive and only the financially strong are going to survive.

From ring spinning through warping and including winding, twisting, and spooling, it is a different story. There has not been a major, successful, predictable breakthrough in the dust control technology for these process areas. The major benefit in these areas has occurred because of the results achieved in removing the dust in the processes that precede ring spinning through warping.

Since it appears that a majority of the mills are already in compliance, I do not foresee anyone spending the large amounts of dollars required in research and development to effect a breakthrough in technology to satisfy the remaining market. I would like to comment at this point that there are important, significant parts of the industry—specifically it relates to coarse yarn counts—that fall outside this area. They have difficulties. The technology is not necessarily there, and the actual problems are too difficult and the possible rewards too small, in my judgment, to effect a technology breakthrough.

Cotton weaving is in a similar situation except that there are a couple of additional considerations. The room ambient dust level in weaving is quite often raised by the presence of sizing dust, lubricant particles, and mineral matter from atomized spray water. None of these items have been correlated to byssinossis but all of them might be measured by the vertical elutriator, which is the mandated sampling device. Here again, efforts to improve the dust control technology have not been significant.

If you go back and look at the 1977 testimony made before OSHA in April, a colleague of mine and competitor spelled out—based on studies that were made for NIOSH under contract—the difficulties in the technology in the same relative areas that I have broken down those technologies. Basically, what he said in that testimony at that time is still true today. He predicted what would happen up through the card room and what would happen beyond it. Essentially, if you go back and review that it is still true today.

Concerning the effect of new cust control technology on productivity in the industry, I do not see it as having been a positive one but rather a net negative factor. It is true that dust control developments have occurred simultaneously and coincidentally with increased rates of machinery output but they have not come without increasing the unit cost of that output.

The textile industry has had to invest hundreds of millions of dollars for dust control equipment along with the cost for operating, maintaining, and periodically replacing it. These systems are very energy-intensive air systems in their own right, and they have required an additional investment of hundreds of millions of dollars in air conditioning and refrigeration equipment in order for the mills to operate. These supplementary air conditioning systems are costly to operate and maintain, also. While my company has been a direct beneficiary, as my industry has, from these expenditures, I must say that I question the supposition of a positive effect as put forward by those who have not really considered all the elements of cost involved when measuring productivity.

I guess the easiest way to make that point is that when people from my industry, on a worldwide basis, go to our customers to sell purely dust control business as opposed to the productive output that can be gained by the technology, they do not beat our door down to bring business to us but rather look at us as the undertaker when we come to see them.

In closing, I would like to support the view of those who encourage the Government to work on the cause and source rather than the result. The causative agent of byssinosis must be identified and, where it is found in cotton, it should be removed prior to its being introduced into any of the many textile processes. Hopefully we can reorient our vision and use our collective resources more wisely.

I appreciate the opportunity you have given the American Textile Machine Association to present its views.

[The prepared statement of Mr. Thackston follows:]

STATEMENT OF PERCY L. D. THACKSTON
EXECUTIVE VICE PRESIDENT
THE BAHNSON COMPANY, WINSTON-SLAEM, NORTH CAROLINA
ON BEHALF OF THE AMERICAN TEXTILE MACHINERY ASSOCIATION
BEFORE THE
HOUSE COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT
SEPTEMBER 22, 1982

My name is Percy Thackston, and I am Executive Vice President of The Bahnson Company in Winston-Salem, North Carolina. I am here today on behalf of the American Textile Machinery Association, known as ATMA, a nonprofit trade association representing U.S. manufacturers of complete textile machines, accessories, parts, attachments and supplies.

I am a 1959 graduate of the N.C.State University School of Engineering with a B.S. degree in air conditioning. I have been with The Bahnson Company since June of 1959 and I have had progressive working experience in engineering, product development, field service, sales, manufacturing, operations planning and general management.

Bahnson has served the textile industry as specialists in providing air processing products and systems for about 67 years, and I have had the pleasure of being a part of Bahnson and its growth for over 23 of those years. Bahnson is not just a domestic supplier; we are a world wide supplier, having equipment operating in about 100 countries throughout the world. The name Bahnson is synonymous with textiles anywhere in the world and Bahnson is considered one of the world leaders in the field. Bahnson's primary endeavors in the textile industry involve providing engineered systems for cleaning and conditioning the working space and equipment for cleaning textile machines.

Relative to the American Textile Machinery Association, I have included a fact sheet (Attachment I) which provides pertinent data and background on the organization and at the present time, I am a director and officer of ATMA. ATMA has been very active in promoting dust control activities and in fact established the criteria for a uniform method of measuring dust emissions from textile machinery (Attachment II).

We have been asked to testify on dust control technology. More specifically, we were asked to discuss the available technology for controlling cotton dust levels in the textile industry and the effect of new dust control technology on productivity in the industry.

Significant improvements have been made in modern, high production, textile processing systems that separate the trash, dirt and foreign matter from the cotton fibers in the processes involved in converting the fiber to sliver or roving. General emphasis by the machinery and equipment builders on cleaning the cotton in the processes up through the card room and including carding, drawing, lap winding, combing and roving have resulted in eliminating much of the dust in the early stages of manufacturing yarn. (See Attachment III for a typical process flow diagram for a cotton textile system.)

Along with the progress made by the machinery builders, there has been improvement in the technology applied by designers of engineered dust abatement systems. This increased technology falls into four general areas:

1. Improvements in the capture techniques at the points of dust release from the processing equipment.
2. Improvements in the transport or pneumatic conveying systems.
3. Improvements in the filter trains that separate the waste fiber and dust from the suction cleaning air systems.
4. Improvements in handling and disposing of the separated waste fibers and dust.

Technology is presently available for controlling dust from opening through the card room by the use of modern machinery and equipment. The risk of non-compliance is low where new opening and cleaning with automated stock feeding through chutes to enclosed cards is possible and new engineered dust abatement systems are applied. Major expenditures in this area in recent years by the mills have met with very good results.

However, for those mills with older equipment such as handfed opening, outmoded cleaning, conventional two beater pickers and typical medium production cards, the risk of noncompliance is high regardless of how well designed the dust control system may be. In these mills, the actions of the workers and the work practices themselves cannot always be overcome by existing technology used in dust abatement systems. In order to assure compliance, it requires an investment in both new production machinery and dust control equipment. Compliance is very capital intensive and only the financially strong will survive.

From ring spinning through warping, it is a different story. There has not been a major, successful, predictable breakthrough in the dust control technology for these process areas. The major benefit in these areas has occurred because of the results achieved in removing the dust in the processes that precede ring spinning through warping. Since it appears that a majority of the mills are already in compliance, I do not foresee anyone spending the large amounts of dollars required in research and development to effect a breakthrough in technology to satisfy the remaining market. The actual problems are too difficult and the possible rewards too small.

Cotton weaving is in a similar situation except that there are a couple of additional considerations. The room ambient dust level in weaving is quite often raised by the presence of sizing dust, lubricant particles and mineral matter from atomized spray water. None of these items have been correlated to byssinossis, but all of them might be measured by the vertical elutriator which is the mandated sampling device. Here again, efforts to improve the dust control technology have not been significant.

Concerning the effect of new dust control technology on productivity in the industry, I do not see it as having been a positive one but rather a net negative factor. It is true that dust control developments have occurred simultaneously with increased rates of machinery output, but they have not come without increasing the unit cost of that output. The textile industry has had to invest hundreds of millions of dollars for dust control equipment along with the costs for operating, maintaining and periodically replacing it. These systems are very energy intensive air systems in their own right and they have required an additional investment of hundreds of millions of dollars in air conditioning and refrigeration equipment in order for the mills to operate. These supplementary air conditioning systems are costly to operate and maintain. While my company has been a direct benefactor from these expenditures, I must say that I question the supposition of a positive effect as put forward by those who have not really considered all the elements of costs involved when measuring productivity.

In closing, I would like to support the view of those who encourage the government to work on the cause and source rather than the result. The causative agent of byssinossis must be identified and where it is found in cotton, it should be removed prior to its being introduced into any of the many textile processes. Hopefully, we can reorient our vision and use our collective resources more wisely.

I appreciate the opportunity you have given ATMA to present our views.

ATTACHMENT I

ATMA FACT SHEET

The Association: Founded in 1933, ATMA is the only U.S. trade association devoted solely to the advancement of U.S. based manufacturers of textile machinery, ancillary equipment and parts. Its members annually produce the substantial majority of textile machinery made in the U.S. The organization is housed in the Washington, D.C. area, under the management of full time employees, being funded by exhibition revenue and member dues.

The Industry: There is concentration in the Southeast and New England. Leading machinery states by employment are: South Carolina, North Carolina, Massachusetts, Pennsylvania, Georgia, Rhode Island and New York. North Carolina has more establishments than South Carolina.

The U.S. Government Standard Industrial Classification Code for textile machinery, 3552, includes many equipment types beginning with cleaning and opening, through spinning and weaving, to finishing, and parts and accessories. Of roughly 600 U.S. firms, about 200 make complete machines. Parts and accessories revenue may account for 40 percent of yearly industry sales. Textile machinery is an industry of small businesses. The 1977 government Census of Manufactures (taken at five-year intervals for years ending in "2" and "7") revealed a downward trend of employment, about 26,000 workers compared to 42,000 in 1966. Domestic market penetration by foreign suppliers has grown from 10 to 50 percent in recent years. The annual U.S. market exceeds one billion dollars and the exploding world market is from seven to ten billion dollars. Exports account for approximately 35% of sales.

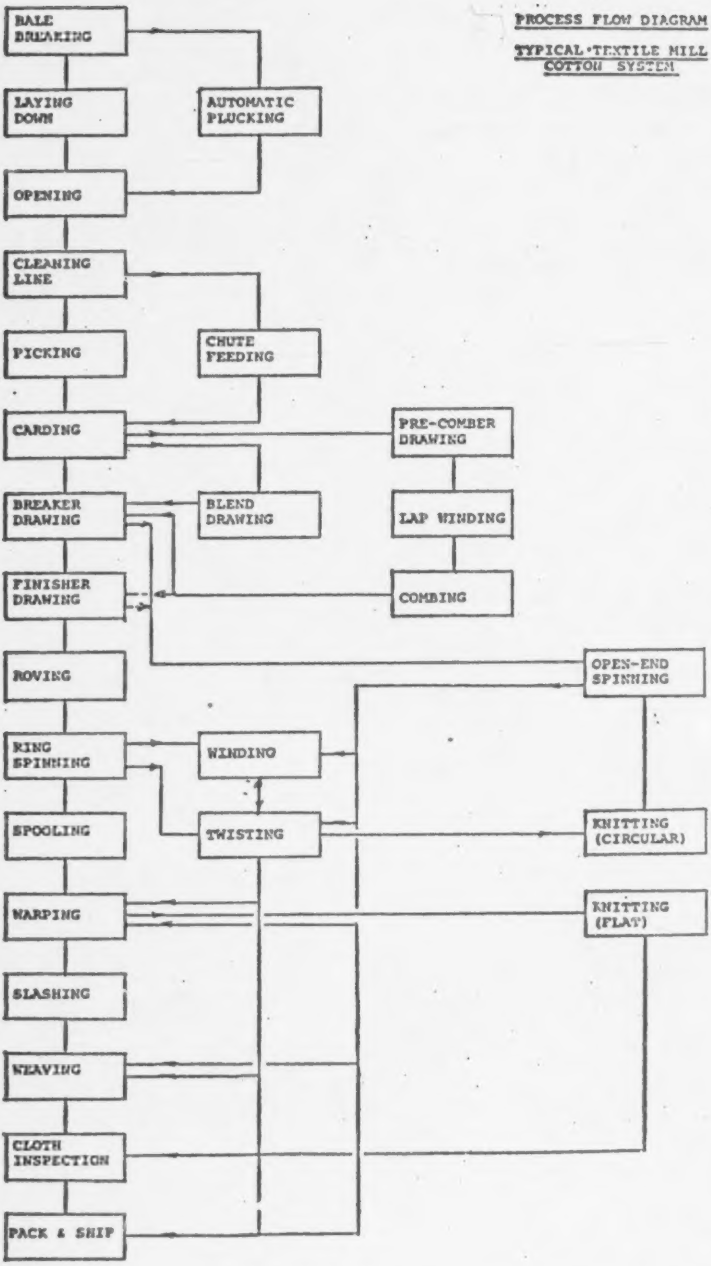
The next census is expected to reveal some dramatic changes from 1977, as there is a trend of European and Japanese production facilities to U.S. soil. Conversely, the U.S. industry's competitive survival, acquisition of development capital, rests a great deal on sales to developing and expanding offshore markets.

The Organization of ATMA: A non-profit corporation (IRS tax status 501-C (6)), ATMA's policy control is by elected industry executives consisting of four officers, a board of directors and an executive committee. Two staff members hold officer status, participate in the policy-making process, and are responsible for operations.

Standing and ad hoc committeesare the backbone of output, service and participation, with the majority of member firms participating in the committee structure. Leadership rotation and member participation are practiced. For example, of the 24-man Board, only five have service predating 1975. Frequently, member firms are reminded of participation opportunity. Professional staff assures policy and program continuity and consistency.

Undergirding these elements is external expertise by retention of legal counsel, public accounting firm, government affairs specialists, and periodic use of communications specialists, exhibition managers, and business consultants.

ATTACHMENT III


BALE BREAKING
LAYING DOWN
AUTOMATIC PLUCKING
OPENING
CLEANING LINE
PICKING
CHUTE FEEDING
CARDING
PRE-COMBER DRAWING
BREAKER DRAWING
BLEND DRAWING
LAP WINDING
FINISHER DRAWING
COMBING
ROVING
OPEN-END SPINNING
RING SPINNING
WINDING
SPOOLING
TWISTING
KNITTING (CIRCULAR)
WARPING
KNITTING (FLAT)
SLASHING
WEAVING
CLOTH INSPECTION
PACK & SHIP

PROCESS FLOW DIAGRAM

TYPICAL TEXTILE MILL
COTTON SYSTEM

JANUARY 1980

ATTACHMENT II

ATMA dust measurement criteria for textile machinery

PREPARED BY THE
AMERICAN TEXTILE MACHINERY ASSOCIATION
1730 M STREET, N.W. WASHINGTON, D.C. 20036

I. *Scope, Purpose, and Use*

1.1 The procedures outlined in this document were designed to allow a uniform method and technique for determining the dust emissions (dust level rate) from textile machinery. The necessity to provide common factors for evaluation by textile mills, suppliers of lint and dust control equipment, and textile machinery manufacturers was the prime objective in developing the recommended procedures that follow.

1.2 Although more exacting procedures can be employed, the procedures herein provide adequate methodology to achieve an approximate ambient room dust level.

1.3 A major consideration was to develop, compile, and submit information that would allow for the determination and evaluation of dust emission from textile machines. Such information could then be used by either machinery manufacturers, manufacturers of lint and dust control equipment, or textile mills as a basis upon which to provide information relative to dust levels in a specified area or a work environment.

1.4 It is recognized that modifications of procedures described in this criteria may be necessary; however, documentation of those modifications should be provided to the extent that others seeking to determine dust emission sources and/or levels in the work environment may properly interpret the procedures.

1.5 The procedures described have been proven, by a number of actual machinery studies, to be the simplest, most cost effective, and workable method of determining dust emissions from textile machinery. If new equipment, sampling devices, changes in governmental standards, and new pertinent information is published, it will be reviewed and appropriate revisions of these procedures will be made.

II. *Definitions and Terms*

2.1 *Room Ambient Dust Level:* Room ambient dust level is the all-encompassing dust associated with a given environment, being usually a composite of particulates from all sources internal and external.

2.2 *Background Dust Level:* The dust level (particulate matter) in the machinery environment without the machinery in operation.

2.3 *Bright Light:* Any high intensity white light of 600 watts or more.

2.4 *Capture Velocity:* The air velocity necessary to capture the contaminated air by causing it to flow into the hood or capture device. Opposing air currents should be taken into consideration.

2.5 *Clean Air Filter:* Air cleaning device to remove the light particulate loadings from normal atmospheric air before such air is introduced into the test chamber.

2.6 *Cotton Dust:* That dust present in the air duirng the handling or processing of cotton. Such dust may contain the mixture of many substances including ground-up plant matter, fiber, bacteria, fungi, soil, pesticides, non-cotton plant matter, and other contaminants.

2.7 *Duct Traverse:* Method of measuring, using velocity pressure, as determined by a Pitot Tube, to determine the air quantities in a specified section of a ducting system. (Only accurate at velocities over 2000 fpm.)

2.8 *Duct Velocity:* The average air velocity profile through the duct cross section (must exceed the minimum transport velocity when solid particulate matter is present in the airstream).

2.9 *Dust Collector:* An air cleaning device to remove heavy particulates from exhaust systems.

2.10 *Dust Emission Level (DEL):* The amount of dust emitted from a machine or process measured in micrograms per cubic meter.

2.11 *Entry Loss:* Loss of static pressure caused by air flowing into a duct or hood.

2.12 *Filter:* A device designed for the purpose of removing airborne particulates.

2.13 *Fly:* Visible airborne short fibers.

2.14 *Hood:* A shaped inlet designed to capture contaminated air and conduct it into dust exhaust system.

2.15 *Isokinetic Sampling:* A technique to collect airborne particulate matter so designed that the airstream entering the sampler has a velocity equal to that of the air passing around the sampler.

2.16 *Laminar Air Flow:* A non-turbulent air flow.

2.17 *Lint-Free Respirable Cotton Dust:* Cotton dust whose size is approximately 15 microns or less aerodynamic equivalent diameter.

2.18 *Make Up Air:* Air supplied to an area to replace air removed by exhaust, ventilation, or some machinery process.

2.19 *Mean Dust Concentration:* The average dust level obtained from a given set of samples.

2.20 *Particulate Matter:* A suspension of solid particles in the air.

2.21 *Pitot Tube:* An instrument used to determine the velocity of air by measuring the differential between the total pressure and static pressure in an airstream.

2.22 *Pressure Taps:* A specified point or points either on a machine and/or equipment, ductwork, or connecting devices where pressure is measured in inches of water (centimeters).

2.23 *Production Rate:* The amount of material being processed through a particular machine or machines, measured in pounds (kilograms) per hour.

2.24 *(Q):* Air flow rate measured in cubic feet per minute (CFM), or cubic meters per minute (CMM).

2.25 *Riser Pressure:* The pressure measured in inches or centimeters of water (below atmospheric) in that section of duct or tubing attached to the machine and tying into the main lint and dust control system.

2.26 *Short-Term Monitoring Instruments:* Instruments calibrated to measure respirable cotton dust in a short period of time. They are direct read out, nongravimetric instruments. Such instruments do not necessarily give identical readings to sampling with the vertical elutriators but are useful for quickly detecting changes of dust level.

2.27 *Smoke Generator:* A hand pump which produces smoke visible by the eye. It is used to determine air patterns in the test chamber and around the machine being tested.

2.28 *Static Pressure:* The pressure exerted in all directions by air. It exists by virtue of only the air density and degree of compression. It is expressed in inches of water.

2.29 *Suction Plenums:* A dust and a lint capturing device whose purpose is to capture the emission at the source.

2.30 *Total Pressure:* The algebraic sum of the velocity pressure and the static pressure.

2.31 *Transport (Conveying) Velocity:* The minimum air velocity necessary to suspend particulate in an airstream.

2.32 *Velocity Pressure:* Velocity pressure is the force per unit area of air in the direction of motion. It is expressed in inches or CM of water.

2.33 *Vertical Elutriator (VE) Cotton Dust Sampler:* A dust sampler which collects lint-free respirable cotton dust. Gravimetric analysis of samples is necessary.

2.34 *Waste:* The large particles taken from a textile processing machine, which consists mainly of, but not limited to, fly and ground-up plant matter. Other contaminants such as soil, non-cotton plant matter may be present.

III. *Ideal Environment*

The ideal test chamber environment shall duplicate mill production conditions, including stringent controls of temperature and humidity. Actual testing in the mill environment is not recommended for development of data of dust emissions from textile machines because of the many variables and conditions that cannot be controlled or isolated.

IV. *Actual Environment*

4.1 The actual test chamber environment shall approximate as near as practical the ideal environment with sufficient controls of temperature, humidity, and other conditions (such as low control) which are necessary for the proper machine performance.

4.2 Data being developed and obtained from these procedures will provide sufficient information upon which to determine dust emissions of machines in production operations.

V. *Test Chamber and Supporting Facilities*

5.1 The test chamber shall be constructed of material and in a manner which shall allow the room to be airtight. See Appendix "A" for examples of acceptable test facilities. Other constructions similar in nature will be acceptable as long as sufficient information, on the test chamber, is documented as part of the test study.

5.1.1 Test chamber shall be no smaller in floor area than that which would be occupied by the machinery in an actual mill environment, plus any space needed for normal maintenance. Sufficient space shall be available for the placement of sampling equipment as described in Section "X". The height of the test room shall be no less than 12′ floor to ceiling as shown in Appendix "A".

5.1.2 Adjacent to or part of the test chamber, there shall be constructed an airlock on the entry side. Such airlock shall allow for entry of all material, personnel, and equipment into the test chamber. This airlock will be large enough to accommodate passage of material and equipment into the test chamber during actual testing.

5.1.3 Adjacent to or part of the test chamber, there shall be a clean air chamber into which supply air will be introduced. This chamber shall be large enough to provide for the placement of two vertical elutriators. Such chambers shall be so constructed as to allow for the "soft entry" of the air from floor level in a manner as to not adversely affect sampling characteristics of the vertical elutriators. There shall be an opening at the top of the partition, separating the clean air chamber from the test chamber. This opening should be large enough to allow supply air to enter the test facility at a low velocity and to be drawn down into the air suction devices on the machine being tested. (This simulates the manner in which air conditioning is supplied in the actual mill environment.) To verify the entry air flow pattern of the clean air entry and capture device, a check should be made with a smoke generator. The documentation of the efforts and data of clean air introduction shall be in accordance with the provisions as stated in Section 6.1 and 6.2.

THE TESTING CRITERIA DESCRIBED IN THIS DOCUMENT IS NOT APPLICABLE TO MACHINES WHICH DO NOT HAVE, NOR LEND THEMSELVES TO THE ADDITION OF INDIVIDUAL DUST CAPTURE DEVICES. DATA GATHERED BY THIS METHOD ON SUCH MACHINES SHOULD NOT BE USED TO PREDICT THE RESULTS IN A PRODUCTION ENVIRONMENT BECAUSE OF THE MANY VARIATIONS IN THE WAY THE SUPPLY (CONDITIONED) AIR IS REMOVED FROM THE ROOM AND THE RELATIVE LOCATIONS OF THE AIR REMOVAL OPENINGS TO THE MACHINES.

VI. *Air Supply and Exhaust*

6.1 Suction (Cleaning) Air Sytems

6.1.1 There shall be a suction system of sufficient capacity to meet the air quantity and pressure requirements covering the range of air quantity and pressures for the differing conditions as may be required.

6.1.2 The filter can be either an automatic or manually cleaned type. In either case, the filter shall have a lint (waste) holding capacity to allow for a 4-hour uninterrupted test run.

6.1.3 The suction fan shall have sufficient pressure capacity to overcome the resistance of the lint and dust control collection devices (plenums), the ductwork, and the filter losses, with the filter holding a full 4-hour's waste collection, at the maximum air quantity which may be required.

6.1.4 The amount of suction air must be controlled by means of dampers or similar devices allowing adjustment for pressure changes as the filter loads, and for different air quantities as required for differing operating conditions.

6.1.5 The suction system ductwork shall be installed in such a manner as to allow for the accurate measurement of the air quantity. The duct shall be equipped with a static pressure tap, permitting constant monitoring of the duct pressure at a point which will reflect total air quantity changes caused by the loading of the filter. Adjustments should be made when the static pressure shows a change which would indicate a change of air quantity of 5%.

6.1.6 The suction air shall be discharged to outside the test chamber after filtration.

6.2 Supply (Clean) Air System

6.2.1 There shall be a clean air supply system of sufficient capacity to make up the air extracted from the test chamber.

6.2.2 The filter can be either manual or automatic.

6.2.3 The amount of clean air must be controlled by means of a damper or similar device, allowing for adjustments to compensate for differing air quantities as required for differing operating conditions. The amount of clean air is to be adjusted to give a very slight overpressure in the testing chamber, thus insuring that no dust laden air is brought into the test chamber during normal entries and exits from the test chamber. With the outside airlock door open, crack the door of the airlock to the test chamber and start both fans. Adjust the suction air system to the desired air quantity. Then adjust the clean air supply until there is a slight positive pressure, causing a slight flow from the test chamber. Use a smoke generator to check the flow rate and direction.

6.2.4 It should not be necessary to make adjustments to the supply air system during a test, since the exhaust air quantity is to be held constant during the test.

6.2.5 The dust content of the supply air is to be measured, using two vertical elutriators in the clean air chamber.

VII. *Testing Procedure*

7.1 Air Quantity Determination

Listed below, in numerical sequence, are the steps that should be followed in determining dust emission levels from textile machines. Considerable expansion or discussion might be helpful; but it was felt that the test site operator, using guidelines described below, will have sufficient information upon which to conduct the test procedure.

7.1.1 Be sure the test chamber supporting facilities are as described in Section "V" of this technique.

7.1.2 Insure that test results and specifications are recorded as outlined in Section "VIII" of this technique.

7.1.3 Establish machine performance characteristics by:

a. Select the air quantity to be used for the intitial test. This can be either the nominal air quantity needed for proper machine function (where applicable), or the quantity which appears to be effective in controlling the emission, the latter being determined visually using the smoke generator and bright light.

b. Calibrate the dust and lint control components, using minimum of 4 different air quantities perferably above and below the quantity selected in step 7.1.3a. This information will be reported as shown in Examples "A", "B", and "C".

7.2 Emission Determination

7.2.1 Insure that procedures are followed as described in 6.2.3 of Section 6.2, entitled "Supply (Clean) Air System" for the proper procedure for balancing clean air and suction air.

7.2.2 Begin operation of production machine(s) at desired production level. Machine must be operated for a sufficient period of time to establish a steady state room concentration. A short-term or continuous, non-gravimetric sampling device may be used to determine when the steady state room concentration level is reached.

7.2.3 Conduct (run) two consecutive tests as described in Section "X". If there is a statistically significant difference between test results, additional tests are required until repeatable data can be established.

7.2.4 Enter data as shown on Examples "D", "E", and "F".

7.2.5 If changes or modifications to the lint and dust components and/or air quantity are necessary, then such changes should be made and the steps as outlined in paragraphs 7.1.3 (a) through 7.2.4 above will be repeated, as required.

Every effort should be made to determine the *minimum* air quantity needed. Work toward improving the effectiveness of the capture devices. The high cost of energy dictates against overwhelming the problem with more air.

7.2.6 Prepare and report data on reporting forms similar to Examples "D", "E", and "F".

VIII. *Reporting of Test Results*

8.1 Test Report. A detailed test report shall be compiled for every test made according to the requirements of this technique. The objective shall be to answer any questions which might arise concerning the test. The report shall include at least the following items:

8.1.1 General Information. (Text should be supplemented by tables, photographs, and drawings where appropriate.) *Suggested forms for recording major data items are included as shown in Examples "A" through "F".*

Date and place of test, person responsible for test procedures, reference to this technique.

8.1.2 Reporting of dust levels—as shown in Examples "D", "E", and "F".

8.1.3 Description of Machine: Description of machine in sufficient detail that it cannot be construed to be any other machine. The description might include:

a. Manufacturer, type, and model
b. Serial Number
c. Materials being processed
d. Production speeds
e. Any other characteristics which might affect test results.

8.1.4 Test Environment: Dimensions and descriptions of test room: (See Appendix "A".)

a. Location of machine
b. Description of test site
c. Other factors which might influence results

8.1.5 Instrumentation:

a. Name, type, manufacturer, and serial number of each instrument
b. Instrument arrangement and interconnections
c. Date, place, and method of calibration
d. Other factors which might influence test results

Note: Quality of instrumentation, calibration, test site, and use is to be such that no corrections to readings are required. Therefore, no corrections are to be used or reported.

IX. *Instrumentation*

9.1 General:

9.1.1 The instrument(s) shall:

9.1.1.1 Be generaly accepted by the scientific community in the area of air pollution work and be qualified by recognized independent, government, or university laboratories.

9.1.2 The instrument shall respond to only lint-free respirable dust (defined under "Definitions").

9.1.3 The instrument shall have the capability to measure dust concentrations in the range of .01 to 5 mg/m^3.

9.2 Auxiliary Equipment:

9.2.1 Short-term, non-gravimetric instruments, and other auxiliary equipment, i.e. miniaturized vertical elutriators, which may be useful or needed to facilitate the test program.

9.2.2 Instruments requiring gravimetric analysis of collected sample:

9.2.2.1 The preferred preseparator is an elutriator.

9.2.2.2 PVC membrane filters shall have a 5 micron pore size and shall have a total cross-flow area compatible with instrument air flow rate. The standard flow rate is 7.4 ± .02 liters a minute and the preferred filter diameter is 37 mm.

9.2.2.3 Filter holders (cassettes) shall be used that properly contain and seal the filter.

9.2.2.4 A desiccating cabinet may be used for filter drying prior to weighing. In any case, control filters are to be used.

9.2.2.5 Flow calibration equipment (preferably a wet test meter) shall be available for calibration of instruments utilizing precision flow control components (i.e., critical orifice).

9.2.2.6 A microbalance shall be used in filter weighing. The balance shall have a sensitivity of at least .01 mg and shall be located free of external vibration.

9.2.2.7 A suitable work place for processing open filters shall be maintained.

9.3 Calibration:

9.3.1 Short-term, non-gravimetric instruments:

9.3.1.1 Where practical, test site calibration shall be performed prior to each major test according to manufacturers' instructions.

9.3.1.2 Where test site calibration is not practical, factory calibration shall be performed at six-month intervals or immediately prior to next major test.

9.3.2 Instruments requiring gravimetric analysis of collected sample:

9.3.2.1 Components used for precision air flow control (i.e., critical orifice) shall be calibrated prior to each major test.

9.3.2.2 Where applicable, vacuum pumps shall be checked for ability to maintain 16" Hg. prior to each major test.

9.3.2.3 Equipment used to calibrate precision air flow components shall be recalibrated against a primary source at two-year intervals.

9.3.2.4 Where applicable, the microbalance shall be calibrated prior to each set of weighing according to manufacturers' instructions.

9.4 Maintenance:

9.4.1 Short-term, non-gravimetric instruments:

9.4.1.1 Preseparators and air flow paths (where applicable) shall be cleaned prior to each major test.

9.4.1.2 Fittings and connections shall be inspected and maintained to assure no leakage according to manufacturers' instructions.

9.4.1.3 Electrical and electronic components shall be properly maintained and adjusted by qualified technicians. A thorough check on factory recalibration schedule is recommended.

9.4.2 Instruments requiring gravimetric analysis of collected sample:

9.4.2.1 Preseparators and air flow paths shall be cleaned prior to each major test.

9.4.2.2 Fittings, connections, and tubing shall be inspected and maintained to assure no leakage according to manufacturers' instructions.

9.4.2.3 Vacuum pumps shall be cleaned, inspected, and maintained to assure proper operation according to manufacturers' instructions.

9.4.2.4 Air flow calibration equipment shall be maintained to precise standards.

9.4.2.5 The microbalance shall be maintained to assure proper read out. Adjustments or repairs shall be performed by qualified technicians. It is recommended that a thorough check be made on factory recalibration schedules.

9.4.2.6 Laboratory work place where open filters are processed shall be maintained, as well as all supporting equipment, to assure a clean, dust-free, draft-free atmosphere with proper control of temperature and humidity.

X. *Monitoring Positions*

10.1 The ambient air present in the test chamber shall comprise the atmosphere to be tested. The test locations shall be so situated that the samples taken are representative of the dust levels in the total test chamber.

10.2 The measuring device(s) inlet shall be located at a height of 5'0" above the test chamber floor in the test compartment. A minimum of four (4) sampler positions are to be located within the chamber. Additionally, two (2) shall be located in the supply air plenum. Sampling location will be such that machine operation will not give a localized influence. Care shall be taken to avoid placement of the device(s) in an area of high air turbulence. (See Sections "V", "IX", and "X" and Appendix "C" for sampling recommendations and procedures.)

10.3 For gravimetric testing, the duration of the test shall be sufficient time to collect enough material to provide for accurate weighing.

It is significant to point out that because of the low dust levels that are being measured the normal variation in control filter and in the sensitivity of the balance could be a large percentage of the sample being collected. Longer sampling times might be necessary to obtain sufficient weight on the sample so that this variation can be minimized. Differences in balances and types of cassettes being used could affect this value.

EXAMPLE "A"

DUCT TRAVERSES
PRES. - VOL. CALIBRATION - DUCT TEST NO. _____

DATE:
TIME:
OBSERVERS:

RUN NO. _____

DUCT PRES. _____ in H_2O

COMPONENT	PLENUM PRES.	PIPE AREA	TRAVERSES			V AVG.	Q
#1	.36	8" Ø	1800	2000	1500	1733	156
(Example)		.349ft^2	1900	1900	1300		

#2							

#3							

#4							

#5							

NOTE: Figures used above for example only.

EXAMPLE “B”

DUCT PITOT TRAVERSES

DATE: ____________________

LOCATION: ____________________

EQUIPMENT: ____________________

____

OBSERVERS: ____________________

Temp.________ R.H.________ Time________

NOTES:

DUCT SIZE:

Q Avg.____________

Temp.________ R.H.________ Time________

NOTES:

DUCT SIZE:

Q Avg.____________

Temp.________ R.H.________ Time________

NOTES:

DUCT SIZE:

Q Avg.____________

Temp.________ R.H.________ Time________

NOTES:

DUCT SIZE:

Q Avg.____________

Temp.________ R.H.________ Time________

NOTES:

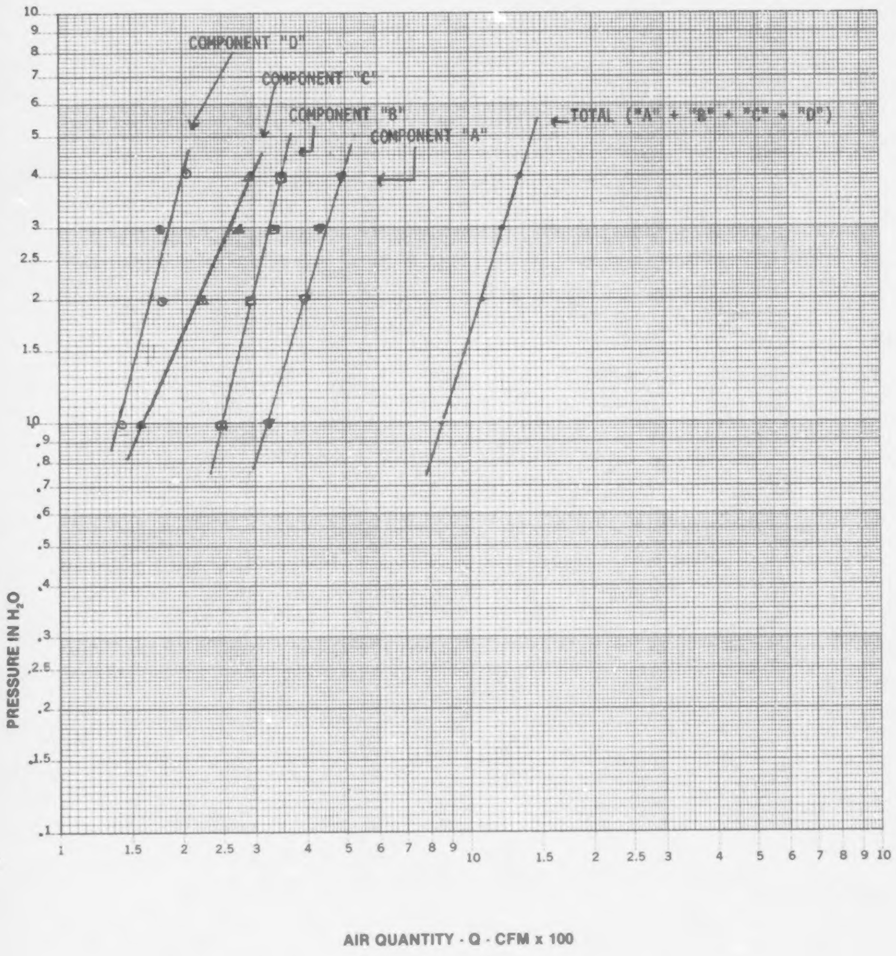
DUCT SIZE:

Q Avg.____________

EXAMPLE "C"

PRES. - VOL. CALIBRATION

DUST TEST



EXAMPLE "D"
SAMPLING DATA LOG

Sampler Position												
Sampler Serial Number												
Orifice Number												
Cassette Number												
Sampling Time	Start											
	Stop											
	Duration											
Filter Weight (Micrograms)	Before											
	After											
Correction Factor (ug)												
Corrected Sample Weight (ug)												
Sampled Air Volume (cubic meters)												
Dust Concentration (micrograms/cubic meter)												

Remarks ____________________

By: ____________________

Date: ____________________

EXAMPLE "E"

DUST COMPARISON TEST

LOCATION:

TEST NO.__________ DATE:__________

INSTRUMENTS OTHER THAN VERTICAL ELUTRIATOR

TIME PRES. Q.	INSTRUMENT*	POSITION				AVG.
		3	4	5	6	
	GCA-RDM					
	GCA-LS					
	TSI-3500					
	GCA-RDM					
	GCA-LS					
	TSI-3500					
	GCA-RDM					
	GCA-LS					
	TSI-3500					
	GCA-RDM					
	GCA-LS					
	TSI-3500					
	GCA-RDM					
	GCA-LS					
	TSI-3500					
	GCA-RDM					
	GCA-LS					
	TSI-3500					
AVG.	GCA-RDM					
	GCA-LS					
	TSI-3500					
	V.E.					

*Other instruments might be used if such instruments are in general use throughout the industry.

EXAMPLE "F"

DUST LEVEL REPORT

V.E. DUST LEVELS — TEST NO. 1

POSITION	1	2	3	4	5	6
ug/m3						

Test Room Level — Avg. 3 - 6 ______________

Supply Air Level — Avg. 1 - 2 ______________

Machine Emission ______________

V.E. DUST LEVELS — TEST NO. 2

POSITION	1	2	3	4	5	6
ug/m3						

Test Room Level — Avg. 3 - 6 ______________

Supply Air Level — Avg. 1 - 2 ______________

Machine Emission ______________

V.E. DUST LEVELS — TEST NO. 3

POSITION	1	2	3	4	5	6
ug/m3						

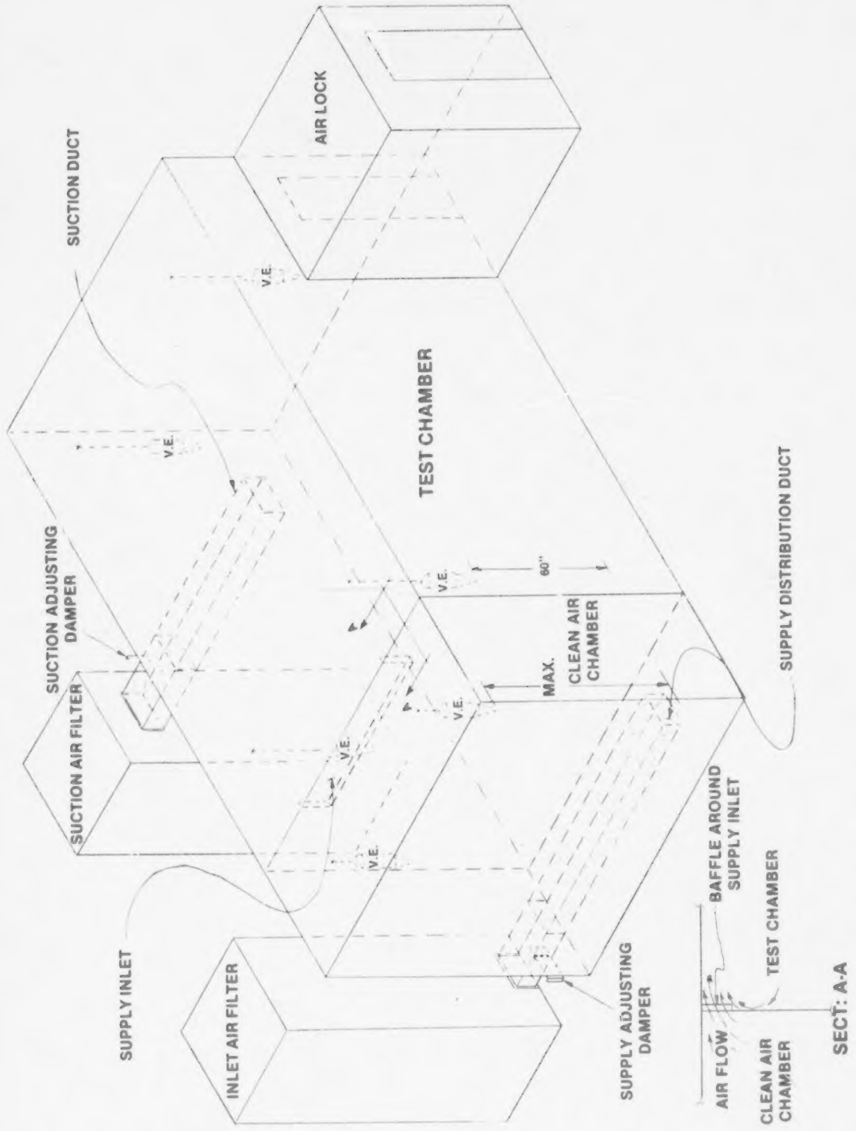
Test Room Level — Avg. 3 - 6 ______________

Supply Air Level — Avg. 1 - 2 ______________

Machine Emission ______________

NOTE: TABLES REPRESENT TEST 1 THROUGH 3 OR AS MANY AS DEEMED NECESSARY TO COMPLETE PROJECT SPECIFICATIONS.

Appendix A


AIR LOCK
SUCTION DUCT
V.E.
TEST CHAMBER
V.E.
SUCTION ADJUSTING DAMPER
V.E.
60"
SUPPLY DISTRIBUTION DUCT
CLEAN AIR CHAMBER
MAX.
V.E.
SUCTION AIR FILTER
V.E.
V.E.
SUPPLY INLET
INLET AIR FILTER
SUPPLY ADJUSTING DAMPER
BAFFLE AROUND SUPPLY INLET
TEST CHAMBER
AIR FLOW
CLEAN AIR CHAMBER
SECT: A-A

Appendix B

Other Factors Affecting Room Dust Levels

The Dust Level Concentration in any actual textile environment is relative to a number of factors. Within each work area a number of different processing machines may be operating. The total amount of dust generated (per unit time) from all fiber processing equipment in that area must be considered in predicting a room dust level. The degree of filtration and the ventilation rate can also effect room levels.

Below is a simplifed equation that reflects a room concentration based on some of these factors.

$$C_s = \frac{\dot{m}(1 - \epsilon E) + Q_v C_{oa}}{EQ_r + Q_v + AV_s}$$

Where:

C_s = Steady State Room Concentration
C_{oa} = Outside Air Concentration
ϵ = Efficiency of any capture device(s)
E = Efficiency of filtration systems
$\dot{m}$ = Dust generation rate in room
Q_r = Filtration system flow rate
Q_v = Ventilation flow rate (fresh air)
A = Floor surface area of the space ventilated
V_s = Settling velocity of dust particles

From this simple equation, it is evident that a number of variables can affect a steady state room condition, even assuming constant Capture and Filtration efficiencies.

Dust Generation Rate ($\dot{m}$)

This factor is the sum total of the generation rates of each piece of fiber processing equipment in the ventilated space. Therefore, the operating characteristics of each type of equipment must be defined in order to predict a total room generation. These characteristics not only reflect the ability to prevent dust from escaping into the room but also the "in duty" factor of the machinery. If the machinery is not in operation, it will not contribute to $\dot{m}$.

Equally important is the factor of m as reflected by the type of stock being processed. The dust generation rate will vary inversely to the quality stock processed. Of course, the processing of blends will affect $\dot{m}$ by diluting the amount of cotton fiber available for dust generation.

Air Flow Rates (Q_r, Q_v)

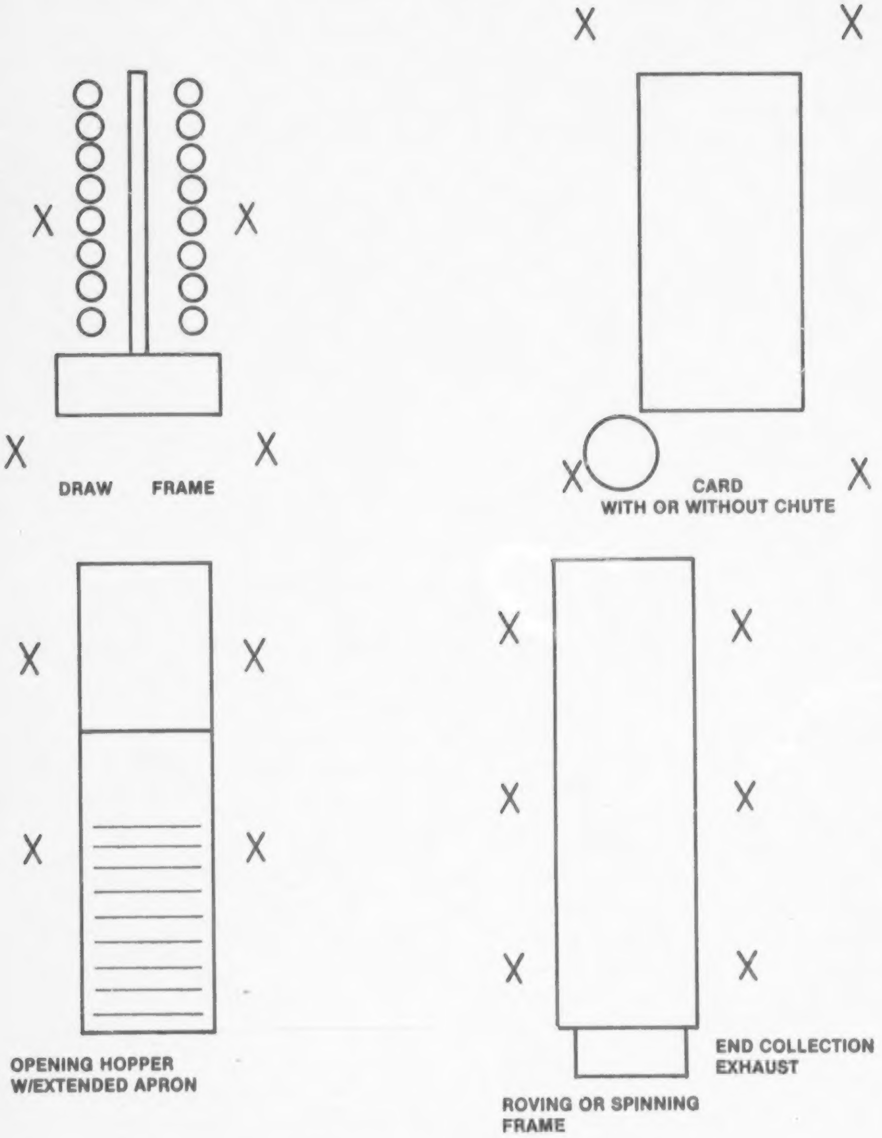
In order to maintain psychrometric conditions in the processing area(s), air conditioning and filtration air supply to the space may vary as outside temperature around the mill varies. As these flow rates change, a resultant change in room concentration can be expected.

Air Flow Characteristics

The proper flow of conditioned air into the space is important not only psychrometrically, but hygienically. Just as temperature and humidity "hot spots" can occur in a work area, similar high areas of dust concentration can occur due to poor air distribution.

"Drift" from one generic work space to another can also contribute to dust concentrations. As air is being returned to the central air conditioning system, it can mix its distinct concentration with that of the air in the ventilated space close to the air conditioning return. In cases where drift occurs it could become very difficult to sustain low dust levels. Air conditioning modifications may be necessary to prevent or accommodate this drift.

Appendix C



DRAW FRAME

CARD
WITH OR WITHOUT CHUTE

OPENING HOPPER
W/EXTENDED APRON

END COLLECTION
EXHAUST

ROVING OR SPINNING
FRAME

SUGGESTED SAMPLE LOCATIONS FOR CERTAIN TEXTILE MACHINERY

Mr. VOLKMER. Thank you very much, Mr. Thackston.

We have a vote that has just been called. We have a little time for a few questions. Then we have to recess, and there may be another vote after that, so we will have to recess, when we do, for a minimum of 15 minutes. I would ask for the panel to stay until we return and complete the questions.

Mr. Brooks, after listening to your testimony, I would like to know basically what role does your department play in controlling the dust levels in the textile plants in North Carolina?

Mr. BROOKS. Only in making random inspections to see that the current standards are complied with. We have been making inspections of the textile plants since the outset of OSHA in 1972 for compliance with all standards. We do wall-to-wall inspections. We previously inspected to see that there was compliance to an interim standard that preceded the current standard, and then since its implementation, we have made the 106 inspections that I have already indicated.

Now we also have a consulting division and an education and training division that provide technical assistance to employers upon their request to deal with any of the technical problems that they have. We will train personnel, for instance, in fitting as well as in making selection and use of respirators, so that we provide technical assistance in compliance as well as have the responsibility for seeing that there is compliance.

Mr. VOLKMER. Now as I understand the testimony, at least what I have heard here so far—I am sorry I could not have attended all of the meeting today—most of the plants, at least in North Carolina, are in compliance with the present standard.

Mr. BROOKS. Of 106 inspections, only 9 gave rise to serious citations; and those, as I indicate, were principally for the lack of use or misuse of respirators.

Mr. VOLKMER. Therefore, I could assume that the technology is presently available for the companies to comply.

Mr. BROOKS. We believe so. We believe that they have demonstrated that and in fact are implementing this very rapidly. Just as Dr. Ruttenberg indicated, many of them that are in the process of retooling for reasons other than compliance are finding that compliance with this standard under those circumstances is extremely easy.

For instance, in touring a Burlington Industries principally weaving plant, they were not sure technologically, by engineering design, what level of compliance they would achieve with a new plant that was replacing what they considered to be an outdated one up in the western part of the State. This was a brandnew plant. It has not operated a year yet. After 6 months operation, they were delighted when the reports coming in showed that rather than 0.200 milligram compliance, they were achieving a level of compliance of 0.0015. They knew and had hoped that they would be well in compliance, but they did not know that they would be so easily in compliance. So we are finding that the technological revolution that is occurring in the industry is such that, for those who have the capital, most of the giants in the textile industry have demonstrated that they can comply and are in compliance for the most part. To be sure, it can present some small companies a serious problem.

Therefore, to the extent that there is a remaining problem financially, it is for the very small, perhaps single-family run company that is having difficulty procuring the capital necessary to make the renovations that would be required, either for increased productivity or for compliance with the cotton dust standard.

Mr. VOLKMER. Mr. Thankston, in that regard, I was listening to your testimony but let's look at it a moment. Let's take the small operation that is still using the older processes. How are they going to compete in today's world, where I am hearing the increased productivity and the better quality of the end product; even if you did not have an OSHA standard and they could still have all the dust they wanted, could they still compete in today's world with the better production, the other plants?

Mr. THACKSTON. Well, let me say this: Apparently they have been competing up to this point.

Mr. VOLKMER. Yes; there is no question about that.

Mr. THACKSTON. It remains to be seen whether they could, and I do not know, but I would take issue with just one point. It is not just the small family-owned, independent mill operations who have some problems. There are significant, and I think worthwhile segments of the textile industry who in the ring spinning through warping area are going to have difficulty complying. They are not just the single, small, independent, family owned businesses.

Mr. VOLKMER. OK. Now that is based on even with the new machinery, the new types of equipment?

Mr. THACKSTON. Yes, sir.

Mr. VOLKMER. Well, I have heard testimony that others with new equipment, it was just testified that a new plant that has been operating 6 months is way below the standard, meets the standard easily.

Mr. THACKSTON. Yes. I am speaking specifically of those people who are producing a certain end product. Those using ring spinning and those machines involved in ring spinning through warping are going to have difficulty complying.

Mr. VOLKMER. What percentage of the total textile industry would that be?

Mr. THACKSTON. I have no definitive answer to that. I do not know how big a percentage that is.

Mr. VOLKMER. Now Mr. Brooks, have you received complaints from the industry about the PEL's?

Mr. BROOKS. I have not received actual complaints about the permissible exposure levels. As I indicated in the remarks that we transmitted May 4 with regard to what we saw as the needs, if any, to revise the standards, if the Federal OSHA was going to open them up at all, we felt that some issues needed to be dealt with that we have received from the industry. These have to do with the action level, the definition of washed cotton, and the issues relating to tiering, medical surveillance, and wage retention. These are areas that need to be refined.

When this proposed standard was first being discussed, industry did have a lot to say about the permissible exposure levels. Since the effective date of it, I have not received the first complaint about the levels that have been established. It is in these other areas, however, where we have run into problems and where, through our consultation, we are finding, in fact, that there are problems. If the standard is to be reviewed, we would hope that there might be some clarification in these areas, without bothering the permissible exposure levels.

I do not think that there is any definitive basis to consider revision of the permissible exposure limits that have been set forth at this time. I think the experience, if anything, validates the exposure levels that have been set.

Mr. **Volkmer**. Thank you very much.

I am going to have to recess to make this vote and for the 5-minute vote later. We will recess until 20 minutes before 4.

[Recess taken.]

Mr. **Shamansky** [acting chairman]. Mr. Brooks, I realize this is not directly in point but it weighs heavily on my mind. I do not happen to be the most popular fellow in North Carolina because I keep trying to get rid of the tobacco allotment program, and that has a tendency to make people sensitive down there.

Mr. **Brooks**. I can understand that.

Mr.**Shamansky**. You can understand that? OK.

Mr. **Brooks**. I appreciate that.

Mr. **Shamansky**. Therefore, when it comes to costs for North Carolina, I am solicitous of their costs, believe it or not, in spite of what you might have heard otherwise. My question is, are compliance costs for the textile industry in North Carolina below what was anticipated?

Mr. **Brooks**. Yes. Well, in my estimation they are. Everybody has had a different estimation, probably. I had an estimate, and I really think that it is more accurate to say "guesstimate." That is about all any of us could do.

Mr. **Shamansky**. However, that would be equally true of those who have to comply. Correct?

Mr. **Brooks**. That is right, and my guess was it could cost the North Carolina textile industry $2 billion.

Mr. **Shamansky**. How much?

Mr. **Brooks**. It would cost $2 billion to comply with the cotton dust standard. This was part of my testimony almost 4 years ago, I suppose, before another committee of the House. I said then that I thought and hoped that it might be kept to $1.5 billion.

Now let me add, at that time I was commenting on the cost to comply with the then-proposed standard. We made many recommendations for alterations in the standard that was before the committee for consideration that day. Many of the changes that we recommended, many of them impacting upon costs, were subsequently included in the new standard. I might add, so often when a person is commenting upon proposed standards, his is dubious because he is afraid that those who have promulgated the standard are so committed to it that they are going to implement it no matter what he says and what the facts and the evidence are about it.

One of my delights in having served the State of North Carolina as Commissioner of Labor is we gleaned from public hearings across North Carolina, from the public, from employers and employees, comments about the then-proposed standard and brought them to the committee here in Washington. And subsequent to that, numerous changes were made in the proposed standard.

Mr. SHAMANSKY. Therefore, there was a flow back and forth.

Mr. BROOKS. As a result, in my estimation, a much more satisfactory standard evolved and a very defensible standard, and one which I estimated—and again, this is a guesstimate—I thought trimmed between half a billion and $800 million off the cost of implementation of the $2 billion I had projected.

Now I am not in a position today to say how much the industry has spent. Dr. Ruttenberg was commenting a little earlier on the fact that it is very difficult for anybody, even in the industry today, because of the technological revolution has been going on, to actually apportion very accurately the cost of what has happened in the industry between just technological innovation, retooling, transformation to accommodate different fibers and products, and just the pure goal of increasing productivity, It is hard to apportion these costs and even then it is difficult to defend the apportionment.

Again, my guesstimate, sir, I have been impressed with what a lot of capital has been invested in the last 5 years, but my guesstimate is and my surprise is the the actual cost one would attribute to just compliance with the OSHA cotton dust standard is considerably below, considerably below what I would have thought it was when I said it would cost $1.5 billion under the new standard.

Mr. SHAMANSKY. Certainly, had there been no expenditures of money to clean up this condition, there would have been costs in terms of health costs, human costs.

Mr. BROOKS. Oh, absolutely.

Mr. SHAMANSKY. Yes, so it is just a question of where, who bears the costs. Correct?

Mr. BROOKS. Moreover, again reiterating what Dr. Ruttenberg indicated a little bit ago, in my estimation—unlike the auto industry, and the steel industry—whether for reasons of compliance with the cotton dust standard or whether that was one of the impetuses, the textile industry, I think, is a very healthy and viable industry today compared to many other American industries, as a result of the capital that they have expended.

Mr. SHAMANSKY. Yes. In other words, it is logical to conclude that you have an increase in productivity——

Mr. BROOKS. Absolutely.

Mr. SHAMANSKY. Which really is an ongoing process, correct?

Mr. BROOKS. Absolutely, and of course, again, part of the productivity is also being derived and realized from healthier employees and less lost time.

Mr. SHAMANSKY. Good. Following, picking up from where Mr. Brooks was, Mr. Lumsden, if I may, you have a background in dealing with byssinosis and cotton dust control. Is that correct?

Mr. LUMSDEN. Yes, sir.

Mr. SHAMANSKY. All right. Now what has been the experience of the smaller textile manufacturers in moving to comply with the cotton dust standard? Have all the manufacturers had trouble complying? In other words, if they put their minds to it, can they accomplish that reasonably?

Mr. **Lumsden**. Our experience with our company, which is my purview right now, we have had some small companies, one- or two-plant type operations, that have achieved compliance. I am not privy to their capital expenditures or what they have to back them up but I have seen small companies that have gotten into complete compliance with quite an expenditure but, as we have said, you know, there were production advantages also to this changeover.

Of course, the larger companies have been there for quite some time——

Mr. **Shamansky**. They have the capital resources to do it.

Mr. **Lumsden**. And they are able to do it. The smaller companies may follow a little behind. I think eventually it would be possible for them, too, if they are a health industry to start with.

Mr. **Shamansky**. Has there been a recognizable response on the part of their employees? Do they become aware of the fact that the company is now doing something to protect their well-being?

Mr. **Lumsden**. Oh, I think so. I think this can be reflected in attitudes in the worker population, in the general improvement of working conditions. I think it probably even is reflected—although we do not have any measure—but probably in product quality and, like we said, absenteeism reductions and this sort of thing, that sense of well-being.

Mr. **Shamansky**. Do you foresee development of more economical, more efficient technology to accomplish this at a lower unit cost? Is there work going on in this area?

Mr. **Lumsden**. I think as time goes on we will probably see reductions. I think the new technology and the instrumentation, or equipment, rather, for processes is going to facilitate the control and this will be an ongoing consideration for all new processes that come up. Industry is not going to accept a new process, even though the production rates are high, if it creates another large dust problem.

Mr. **Shamansky**. Another large what?

Mr. **Lumsden**. A dust problem.

Mr. **Shamansky**. Yes.

Mr. **Lumsden**. I think this will be a parallel development which will continue.

Mr. **Shamansky**. On the part of machinery makers and whoever designs the processes in the first place.

Mr. **Lumsden**. Yes, exactly.

Mr. **Shamansky**. OK. Now, as you have probably already figured out, we have very strange customs in this place. Those bells go off and I have to run, but I will be back. We will adjourn for 5 or 10 minutes.

[Recess taken.]

Mr. **Volkmer** [acting chairman]. The committee will come to order and we will proceed. When my colleague from Ohio, Congressman Shamansky, is back we will let him take the chair again, and then I am going to have to leave. However, we will get it started because we still have another panel.

Now, Dr. Ruttenberg, you have related some interesting findings concerning the modernization factor in the textile industry and productivity. How extensive was your study in regard to this?

Ms. RUTTENBERG. Well, unfortunately the study is not yet finished. I am in the middle of the contract period.

It has been fairly extensive in terms of the written record and only moderately so, I guess, in terms of interviews and specific plant discussions.

Mr. VOLKMER. The research techniques, then, that you are going to use, do they include actually onsite——

Ms. RUTTENBERG. No. They are primarily interviews with industry people.

Mr. VOLKMER. All right. Now the companies that are represented, that you are interviewing, do they fairly well represent the broad spectrum of the textile industry?

Ms. RUTTENBERG. They are mostly the larger companies.

Mr. VOLKMER. The larger companies?

Ms. RUTTENBERG. Yes, sir.

Mr. VOLKMER. You have not gone into the smaller ones or the——

Ms. RUTTENBERG. No. I have been looking at the smaller companies in terms of some of the written data but in all honesty, the interviews have been mostly with the larger companies.

Mr. VOLKMER. If you can arrive at this next question and answer based on your studies so far, then answer; if not, just say so: Would you say that compliance with the cotton dust standard, the present cotton dust standard, is attainable by the industry based on what you have had so far?

Ms. RUTTENBERG. In the vast majority of cases for the vast majority of production processes, it is.

Mr. VOLKMER. What about the exception that Mr. Thackston mentioned. Excuse me, I do not remember all of it because I do not have any textiles, so that terminology is not that familiar to me, but the ring——

Ms. RUTTENBERG. Ring spinning.

Mr. VOLKMER. The ring spinning and these types of things, what about that?

Ms. RUTTENBERG. Well, there are clearly some problems. If you look at Mr. Brooks' survey of weaving, 96 percent of the North Carolina plants that they inspected were in compliance. Mr. Thackston says there are weaving processes which are in trouble.

Mr. THACKSTON. Not weaving.

Ms. RUTTENBERG. I'm sorry.

Mr. THACKSTON. Ring spinning through warping.

Ms. RUTTENBERG. OK. I apologize. Spinning, I think the North Carolina survey had 83 percent in compliance, and that is still 2 years away from the standard's compliance date.

In my experience when I was sitting inside OSHA, there were always individual plants or individual processes, especially in small companies, that needed some special attention, that might have needed a little extra time or a little extra help in coming around to OSHA compliance. I think that is an important issue to look at. Individual companies with problems can always seek additional consideration.

What I think is clearly, though, the result of studies that have been done and the kind of testimony we have heard today is that the textile industry is in a very good position to comply. It is in at least three-quarters of all plants compliance with a standard that it does not have to be in compliance with for another 2 years. The industry's capital investments are increasing, this last year, in a recession year, by $1.6 billion.

What we are going to have is primarily strong compliance and I guess what concerns me is that, while we should look at the three or four plants in this State and the three or four plants in that State which are going to have trouble with compliance, that we ought to look across the board at the industry and see that in the main they are going to do very well. A little bit of a stick on their backs seems to be promoting some investments which in fact are helping the entire industry out of an antiquated setting.

Mr. **Volkmer**. All right, then. Mr. Thackston, after this we will ask you and see what you have to say about it, if you will follow the questions and the answers.

The next one, from what I understand then, listening to you, you believe that the standard is technologically feasible, then, with the present technology.

Ms. **Ruttenberg**. Not only that, in the ATMI and other industry statements before the Supreme Court in 1980 technological feasibility was never challenged. It was cost that was.

Mr. **Volkmer**. All right, then, what about economic feasibility for some of them?

Ms. **Ruttenberg**. Well, I think that is something that deserves very careful attention. What I am particularly interested in, though, is the fact that in contrast with the way OSHA's consultants studied the problem in the seventies, which was the focus on add ons and enclosures and ventilation and things which by and large do not add to the productive capacity of the plant, industry is finding that once it has the regulation, it has a real genius in incorporating technology into the actual engineering and design of equipment while new capital investment may be very expensive, investments are also making the industry more energy efficient, increasing the quality of the textile product, and so on as we have been discussing. Therefore, it is really hard to look at what the actual economic costs are.

In the modernization process, one of the things that we are finding is a whole lot of transition in the textile industry. Some small plants are closing. More often, they are being acquired by other companies or there are mergers going on. J. P. Stevens, for example, is expanding its production in a lot of its plants at the same time that it is closing smaller, more antiquated plants. This is logical, since if you increase your production three times over you may then have excess capacity in these less efficient plants that are older. Therefore, when you talk about economic feasibility, if J. P. Stevens tried, perhaps, to modernize one of the plants that it has now closed, they would have found that it was not economically feasible, whereas as part of this whole transition that is going on in technology in the industry, by closing that plant and putting its cotton dust controls into the new, modernized equipment in other plants, economic feasibility is not nearly as much a problem. That is not to say there are not costs; I mean, clearly there are.

Mr. **Volkmer**. Mr. Thackston, would you like to comment on any of those statements?

Mr. **Thackston**. Thank you.

I guess the distinction that I have tried to draw in my testimony, written and verbal, is that up through the card room the technology is available and largely the implementation is in place. Ring spinning through warping—and in my attachment 2 I have a typical cotton flow sheet which covers those areas—for a segment of the industry and, I think, an important segment of that industry, the technology for compliance specifically—more specifically in the coarse yarn operations—the technology is not available if they are way out of compliance.

How there are some things that can be done for those that may be marginal, that maybe can bring them in compliance, but there is a segment of that industry—and as I was asked before, I cannot tell you how many that is—I do not know how many that is. There may be other people in the panel following that can answer that. The second point is relative to the productivity. The distinguishment I am trying to make on productivity is that I do not think anybody—and I think Ruth said this in her statement—anybody can identify but I frankly believe it is awfully hard to say, as John did earlier—to me they are coincidental and simultaneous, not one related to the other. We have been working this field since the fifties, and we learned very early that when you removed some of the waste lint from the machines you also took the the dust out.

The mills themselves were pushing us at that time to come up with ways to improve the atmosphere of the plant. They found out early that by adding systems that took off the waste lint, you also took out dust. By air-conditioning you improved the atmosphere of the plant and the people were more productive. That I will accept fully.

Whether or not you can relate the standard as imposed on the industry by OSHA as having resulted in all of the productive output, in my mind it is totally unrelated. In fact, in my mind it has raised the unit cost of textile output.

Mr. **Volkmer**. Does the removal of the dust through the productivity within the plant have any effect on the equipment itself?

Mr. **Thackston**. Yes, sir.

Mr. **Volkmer**. What effect?

Mr. **Thackston**. In some cases it does. There are some processes, specifically open end spinning, for example, in which it is a requirement. However, there are plenty of processes where it was not a requirement but it has been done. Therefore, the unit cost of those machines which we have built has gone up by that amount.

Mr. **Volkmer**. What I am trying to get at is, let's say you did not have the standard, the OSHA standards, at all. Would there be—because you are still going to try to improve productivity, anybody is going to do that—simultaneously would there have been an effort to reduce dust, lint, et cetera, because of effects on production and effects on machinery?

Mr. **Thackston**. In some machines, specifically open end spinning as an example, the answer would be yes. In others I think probably not.

Mr. **Shamansky**. Would the gentleman yield?

Mr. **Volkmer**. Yes.

Mr. SHAMANSKY. I want to respond, however, briefly, to your statement where you said, "This has raised the unit cost," the OSHA requirement, but you did not say by what percentage, and was there something purchased with that increase in net cost? The mere fact that a net cost was incurred, in the abstract, does not mean that it was a relatively small proportion of the overall cost and that it bought something quite worthwhile, say, better lungs, better health. You are not suggesting that nothing was gained by the increased cost, are you?

Mr. THACKSTON. I am just talking about the unit cost of production only.

Mr. SHAMANSKY. Well, I know, but you said these regulations raised the unit cost.

Mr. THACKSTON. Yes.

Mr. SHAMANSKY. Was something gained in addition to the increase in cost? What was bought with it? Anything, in your opinion?

Mr. THACKSTON. Well, I heard a lot of discussion this morning that could not agree on that point, and they are doctors. I am certainly not going to respond on it. I can only talk about the unit cost of the textile output itself, and it did raise that unit cost.

Mr. SHAMANSKY. I understand that, and I took that as a given. Now I want to proceed from that. You were the one that mentioned something about OSHA before, right, "as a result of OSHA." Do you have any basis for saying that there was no change in the health benefits or the conditions in which these people worked?

Mr. THACKSTON. Oh, sure, I am sure there has been some benefit, absolutely.

Mr. SHAMANSKY. Therefore——

Mr. THACKSTON. I do not know how much.

Mr. SHAMANSKY. No, but I just wanted to make sure that we are talking about cost effectiveness, that there is a benefit——

Mr. THACKSTON. I was talking about unit cost only, unit cost of production.

Mr. SHAMANSKY. OK, but it seems to me I do not want to leave it at that because the implication was, it seems to me, by you, that while there was an increase in cost you seemed to gloss over—at least in my interpretation—the possibility that something was accomplished with that increase in unit cost. I just want to establish that it is your opinion that there could have been something good purchased with that that justified the increase in unit cost.

Mr. THACKSTON. It could have been.

Mr. SHAMANSKY. It could have been. You are not prepared to say that you know that there was none.

Mr. THACKSTON. No. Right.

Mr. SHAMANSKY. OK. Therefore, it could well have been.

Mr. THACKSTON. Yes.

Mr. SHAMANSKY. Dr. Ruttenberg, do you think that something good was accomplished?

Ms. RUTTENBERG. Well, there is one other additional aspect. I mean, there are a lot of ways to measure unit cost. One of the things that oftentimes is left out is any increase in the quality of the product, and if we look at the processes of new technology, yarn quality, cloth quality, reduction in the number of seconds, evenness of the cloth, better selvages in the weaving, there are a very large number of quality improvements which may not be a part of Mr. Thackston's calculations. Quality improvements are the hardest thing to bring back into unit cost. You can put energy efficiency in and labor——

Mr. SHAMANSKY. Yes. I just wanted to establish—I clearly reacted to the statement, per se, nothing else explained, "OSHA increased unit cost," and leaving it at that. I am not going to beat it to death but I did want to establish that something worthwhile could have been purchased, even though you may not feel qualified to identify what that might be.

Thank you.

Mr. GORE. I would like to apologize to this panel for the fact that I have had to be away at another proceeding, and I would like to thank you all for your appearance here today. On behalf of the subcommittee, I would like to thank you.

Our last panel today is made up of trade association representatives and the union perspective: Mr. James Martin, president of TiCaro, Inc., in Gastonia, N.C., representing the American Textile Manufacturers Institute; Dr. Phillip Wakelyn, manager of environment and safety technology with the National Cotton Council of America; and Mr. Scott Hoyman, the executive vice president of the Amalgamated Clothing & Textile Workers Union.

Gentlemen, I would like to welcome you to the subcommittee. Dr. Wakelyn, as a fellow Tennessean, I would like to extend a special welcome to you.

We will begin with Mr. James Martin, president of TiCaro, Inc., representing the American Textile Manufacturers Institute. Mr. Martin, without objection your entire prepared statement will be included in the record in full, and we invite you to proceed with your presentation as you see fit.

I am sorry that the proceedings have been as long as they have today, and interrupted, but we appreciate your patience. Please proceed.

STATEMENTS OF JAMES H. MARTIN, PRESIDENT, TICARO, INC., REPRESENTING THE AMERICAN TEXTILE MANUFACTURERS INSTITUTE, ACCOMPANIED BY DR. PHILLIP WAKELYN, MANAGER OF ENVIRONMENT AND SAFETY TECHNOLOGY, NATIONAL COTTON COUNCIL OF AMERICA; AND SCOTT HOYMAN, EXECUTIVE VICE PRESIDENT OF AMALGAMATED CLOTHING AND TEXTILE WORKERS UNION

Mr. MARTIN. Thank you.

My name is James H. Martin, Jr., and I am appearing today on behalf of the American Textile Manufacturers Institute, of which I am second vice president. I am also president and chief executive officer of TiCaro, Inc., of Gastonia, N.C.

ATMI is the national trade association of the textile industry, representing more than 80 percent of the spinning, weaving, dying, and finishing of textile products in this country. Cotton is a major raw material in the manufacture of textile products and textile users of cotton generally are subject to the cotton dust occupational health standard of the Department of Labor. Thus, our industry has been vitally involved and interested in the issues concerning cotton dust exposure of textile workers, control of these levels, and steps to eliminate byssinosis completely as an ailment suffered by textile workers. Perhaps we can characterize our purpose in meeting here today as a review of where we are right now and where we seem to be heading.

At the outset permit me to observe that it is in the self-interest of the textile industry to maintain its skilled employment force unimpaired in its conduct of its daily job chores, free of any threat of illness from workplace conditions, and functioning free of injury due to dangerously unwise conditions in the workplace. We pride ourselves in the quality of our industry's products and in the proficiency with which we manufacture them. The success of our enterprises depends on how well we do that job. We cannot accomplish these objectives with a sick or maimed working force.

The textile industry has rated as high as third but no lower than fifth in recent tabulations of data on the incidence of days away from work due to injuries and illnesses among the 45 categories of industries reported by the National Safety Council. In 1981 ATMI initiated a contest to make the textile industry first in safety. Data on injuries and illnesses from the participating companies showed a collective improvement of 15.4 percent for 1981 over 1980, and the level for the first 6 months of 1982 is 33.5 percent below the 1980 level. We believe these actions and our industry's response demonstrate how seriously we operate in the same corner with our employees.

Mr. Chairman, I have a lot more to read, but if you do not mind I'd like to comment here. At times we feel a little overwhelmed by criticism of our industry that we are "killing people," that we do not care. We have been bombarded with rhetoric, inflammatory, demagogic, from the press, from the unions, from the political arena, and it makes me sick because I do not know of a single person in the textile industry who would purposely permit killing an employee.

To place a little perspective on where we are today, it should be pointed out that the present cotton dust standard entered its present life in March 1980 and will become fully effective in March 1984. The benchmark work for the standard lies in the studies by Dr. Merchant, whom we all heard earlier today, early this morning, and some of his associates 10 years earlier under conditions that no longer exist. From studies conducted later than these Merchant efforts and encompassing larger worker populations, we learned that the actual prevalence of byssinosis in the textile manufacturing industry is far below the levels suggested by Dr. Merchant.

During the rulemaking proceedings, and including comments in the hearings in 1977 which OSHA conducted prior to issuing of the present standard in 1978, attention was called to the fact that the Merchant studies produced the highest possible value of predicted prevalence in any hypothesized dust level. Indeed, Dr. Merchant himself testified, "clearly no inference from our study can be drawn as to the prevalence of byssinosis in the entire U.S. textile industry."

Despite this pointed declaration, the Department established a standard based on the Merchant data, and we in the industry were compelled to go to court. The court reviewed the measures taken by OSHA in preparation for the standard and concluded that steps taken by the Department were sufficient to overcome the questions about health and feasibility, despite evidence submitted by the industry.

Early in 1981, the Department of Labor initiated a review of the cotton dust standard even before the Supreme Court had completed its review. Industry again began the tedious process of gathering information in support of its position. After the court decision was handed down at the end of June, the agency was compelled to reshape its basis for review, which it did early in 1981. The textile industry has participated in this review and has gathered data which has been submitted to the agency in several statements.

In summary, the health data submitted to OSHA by ATMI has demonstrated the impact of cotton dust exposure on cotton textile employees as far less than predicted by the Mercahnt data. Regulation of the workplace dust levels need not be as rigorous as the standard demands. Work practices and medical surveillance of the employees, and transfers for those identified as unable to tolerate continuing exposure to cotton dust, continue to be the best control techniques.

With the permission of the subcommittee, we would like to submit for the record of these hearings the several statements filed by ATMI with OSHA, containing the information referred to above.

Mr. GORE. Without objection, I think it is quite appropriate for them to be included in the record. We will put them in the record.

[Because of the voluminous nature of the material it is not reprinted here. The documents can be found in the OSHA docket.]

Mr. MARTIN. Thank you, sir. The chief counsel has those already.

The material presented to OSHA during this review, and which I have asked to have inserted in the record, includes major commentary on the health aspects. Supplemental statements dealt in greater depth with: one, the health effects; two, dust exposure levels; three, multishift monitoring; four, economic information; five, technical information; six, a statistical analysis of dust variations; and, seven, a professional review of a study of textile workers by Beck and others.

I believe our health effects analyses merit some attention at this time. In one submission, ATMI presented a statistical summary of questionnaire responses obtained from member-companies for the purpose of giving a very quick but rough indication of the size of the health problem we, in the industry, were facing. It was based on medical surveillance data collected under the requirements of the cotton dust standard.

We did not write those rules, Mr. Chairman—we merely followed them. The results dramatically show those suffering from disabling byssinosis are only four-tenths of 1 percent of the exposed population. We sincerely believe that a textile worker starting to work today in a textile mill with a medical surveillance program will not contract byssinosis.

If I may comment parenthetically, while I cannot speak, sir, for all the people in this industry, it is a very competitive industry, and while I am here representing the industry as an ATMI officer, I can say that many textile companies like ours will simply not hire a person that has any breathing difficulty whatsoever today. I do not care how old they are, who they are, where they come from, if they even show any hint of a breathing disability, we will not put them in our mills.

In addition to the material just mentioned, other more detailed surveillance data also gathered as required under the cotton dust program was obtained from a group of large companies who maintain full-blown medical surveillance programs in-house. To assist us in a proper professional medical examination of the meaning of these data, we employed Dr. Harold Imbus of Health and Hygiene, Inc., to tell us what they show with respect to our employees in light of the cotton dust standard requirements.

Particular attention was directed to the question of whether cotton dust illness was a serious factor and, if so, how it related to the exposures we were experiencing. Earlier, you heard from Dr. Imbus about the study and how it again demonstrated that the health and experience of the industry does not bear out the byssinosis prevalence predictions in the standard. Reports such as these, done over time, will show a declining rate of illness.

Technological advances in the textile industry have been revolutionary over the past 25 years particularly. Some of these remarkable developments include automated opening and picking, which you have heard about before; chute-fed carding; open-end spinning; shuttleless looms; and innovative air handling equipment. The productivity gains and quality improvements resulting have been truly remarkable but have not been sufficient to discourage major invasions of the U.S. market by competitors abroad.

Although the U.S. textile industry is the most modern and technologically advanced in the world, our competitive position is not secure and we must struggle daily to improve even more. The burdens imposed upon the industry by Government regulations which are not conducive to more effective operations are of little help to our world competitive position, and the OSHA cotton dust standard is an example.

We are as anxious as anyone to assure a safe and healthy workplace for our employees, but when the regulations go beyond what is needed, the diversion of scarce assets to meet those regulations becomes counterproductive.

These developments also have proven effective toward eliminating or diminishing worker exposure to cotton dust. The industry has achieved dust level reductions approaching the requirements of the OSHA standard, but not across the board. For example, some mills have yet to find usable technology within their present means to achieve the standard for the ring spinning, twisting, winding, spooling, and warping of coarse count yarns. We have spent a lot of money to get where we are but problem areas still remain. Time and an improvement in business conditions should help us. It takes time for technology advances to arrive and be affordable.

In closing, the textile industry believes most earnestly that the only real long-term solution to the byssinosis problem can come through research. We strongly support programs already initiated at the Department of Agriculture to continue enlarged research activities dedicated to the identification of the causative agent in cotton dust and to developing the most proficient method of removal from cotton before it arrives at the cotton textile plant.

Thank you very kindly for this opportunity to present our views. I will certainly be glad to answer any questions.

[The prepared statement of Mr. Martin follows:]

Statement of
American Textile Manufacturers Institute
Before the
House Committee on Science and Technology
Subcommittee on Investigations and Oversight
September 22, 1982

Mr. Chairman, my name is James H. Martin, Jr. I am appearing today on behalf of the American Textile Manufacuturers Institute of which I am Second Vice President. I am also President and Chief Executive Officer of Ti-Caro, Inc. of Gastonia, North Carolina. ATMI is the national trade association of the textile industry representing more than 80% of the spinning, weaving, dyeing and finishing of textile products in this country. Cotton is a major raw material in the manufacture of textile products and textile users of cotton generally are subject to the cotton dust occupational health standard of the Department of Labor. Thus our industry has been vitally involved and interested in the issues concerning cotton dust exposure of textile workers, control of those levels, and steps to eliminate byssinosis completely as an ailment suffered by textile workers. Perhaps we can characterize our purpose in meeting here today as a review of where we are right now and where we seem to be heading.

At the outset, permit me to observe that it is in the self-interest of the textile industry to maintain a skilled employment force unimpaired in its conduct of its daily job chores, free of any threat of illness from workplace conditions and functioning free of injury due to dangerously unwise conditions in the workplace. We pride ourselves in the quality of our industry's products and in the proficiency with which we manufacture them. The success of our enterprises depends on how well we do that job. We cannot accomplish those objectives with a sick or maimed working force. The textile industry has rated as high as third but not lower than fifth in recent tabulations of data on the incidence of days away from work due to injuries and illnesses among the 45 categories of industries reported by the National Safety Council. In 1981, ATMI initiated a contest to make the textile industry "First in Safety". Incidence data on injuries and illnesses for the participating companies showed a collective improvement of 15.4% for 1981 over 1980 and the incidence level for the first six months of 1982 is 33.5% below the 1980 level. We believe these actions and our industry's response demonstrate how seriously we operate in the same corner with our employees.

To place a little perspective on where we are today, it should be pointed out that the present cotton dust standard entered its present life in March, 1980, and will become fully effective in March, 1984. The benchmark work for the standard lies in studies by Dr. Merchant and some of his associates nearly ten years earlier under conditions that no longer exist. From studies conducted later than these Merchant efforts and encompassing larger worker populations, we learned that the actual prevalence of byssinosis in the textile manufacturing industry is far below the levels suggested by Dr. Merchant. During the rulemaking proceedings, and including comments and hearings in 1977, which OSHA conducted prior to issuing of the present standard in 1978, attention was called to the fact that the Merchant studies produced the highest possible value of predicted prevalence at any hypothesized dust level. Indeed, Dr. Merchant himself testified "clearly no inference from our study can be drawn as to the prevalence of byssinosis in the entire U.S. textile industry". Despite this pointed declaration, the Department established a standard based on the Merchant data and we in the industry were compelled to go to court. The court reviewed the measures taken by OSHA in preparation for the standard and concluded that steps taken by the Department were sufficient to overcome the questions about health and feasibility despite evidence submitted by the industry.

Early in 1981, the Department of Labor initiated a review of the cotton dust standard even before the Supreme Court had completed its review. Industry again began the tedious process of gathering information in support of its position. After the court decision was handed down at the end of June, the Agency was compelled to reshape its basis for review, which it did early in 1981. The textile industry has participated in this review and has gathered data which has been submitted to the Agency in several statements.

In summary, the health data submitted to OSHA by ATMI has demonstrated the impact of cotton dust exposure on cotton textile employees as far less than predicted by the Merchant data. Regulation of the workplace dust levels need not be as rigorous as the standard demands. The most critical control technique continues, as anticipated by the industry during the OSHA rulemaking proceedings, to be a program of work practices and medical surveillance of employees supported by transfer policies for those individuals identified through the surveillance as unable to tolerate continuing exposures to cotton dust.

With the permission of the Subcommittee, we would like to submit for the record of these hearings the several statements filed by ATMI with OSHA containing the information referred to above.

The material presented to OSHA during this review, and which I have asked to have inserted into the record, include major commentary on the health aspects and further demonstration that the standard anticipates levels of byssinosis far in excess of those actually occuring as well as suggestions on how to deal with several nuts and bolts problems that have arisen out of the operation of the standard. Supplemental statements dealt in greater depth with the health effects data, dust exposure levels, multi-shift monitoring, economic information, technical information, a statistical analysis of dust variations and how this might impact on the frequency of monitoring, and a professional epidemiological review of a study by Beck and others on "Follow-up of Active Retired Cotton Textile Workers".

I believe our health effects analyses merit some attention at this time. In one submission, ATMI presented a statistical summary of questionnaire responses obtained from member companies for the purpose of giving a very quick but rough indication of the size of the health problem we in the industry were facing. It was based on medical surveillance data collected under requirements of the cotton dust standard as an indication of the state of health of those employees exposed to cotton dust. We didn't write those rules - we merely followed them. The results dramatically showed those suffering from disabling byssinosis to represent only 0.4 percent of the exposed population. We believe that as time goes on the figure will become smaller and smaller as medical surveillance programs permit us to identify and isolate those individuals who are particularly susceptible. We sincerely believe that a textile worker starting to work today in a modern textile mill with an operating medical surveillance program will not contact byssinosis. In addition to the material just mentioned, other more detailed surveillance data also gathered as required under the cotton dust program, were obtained from a group of large companies who maintain full-blown medical surveillance programs in-house. To assist us in a proper professional medical examination of the meaning of these data, we employed Dr. Harold R. Imbus of Health and

Hygiene, Inc., to tell us what they seem to show with respect to our employees in light of the cotton dust standard requirements. Particular attention was directed to the questions of whether cotton dust illness was a serious factor and, if so, how it related to the exposures we were experiencing. Earlier you heard from Dr. Imbus about the study and how it again demonstrated that the health and experience of the industry does not bear out the byssinosis prevalence predictions in the standard. Reports such as these, done over a progression of time, are bound to show a declining rate of illness as the company medical surveillance and transfer programs take hold.

Technological advances in the textile industry have been revolutionary over the past 25 years particularly. Some of these remarkable developments include automated opening and picking, shute fed carding, open end spinning, shuttleless looms and innovative air handling equipment. The productivity gains and quality improvements resulting have been truly remarkable but have not been sufficient to discourage major invasions of the U.S. market by competitors abroad. Although the U.S. textile industry is the most modern and technologically advanced in the world, our competitive position is not secure and we must struggle daily to improve even more. The burdens imposed upon the industry by government regulations which are not conducive to more effective operations are of little help to our world competitive position and the OSHA cotton dust standard is an example. We are as anxious as anyone to assure a safe and healthy workplace for our employees but when the regulations go beyond what is needed, the diversion of scarce assets to meet those regulations becomes counterproductive.

These developments also have proven effective toward eliminating or diminishing worker exposure to cotton dust. The industry has acheived dust level reductions approaching the requirements of the OSHA standard, but not across the board. For example, some mills have yet to find usable technology within their present means to achieve the standard for the ring spinning, twisting, winding, spooling and working of coarse count yarns. We have spent a lot of money to get where we are, but problem areas remain. Time and an improvement in business conditions should help us. It takes time for technology advances to arrive and raising capital is tough when business is slow and interest rates are high.

In closing, the textile industry believes most earnestly that the only real long-term solution to the byssinosis problem can come through research. We strongly support programs already initiated at the Department of Agriculture to continue enlarged research activities dedicated to identification of the causative agent in cotton dust and to developing the most proficient method of removal from cotton before its arrival the cotton textile mill.

Thank you for the opportunity to present our views and I would be glad to try to answer questions.

Mr. GORE. Thank you very much for an excellent statement. I will hold questions until we finish this panel.

Dr. Philip Wakelyn is manager of environment and safety technology with the National Cotton Council of America in Memphis. Welcome, Dr. Wakelyn.

Dr. WAKELYN. Thank you, Mr. Chairman.

The National Cotton Council, with headquarters in Memphis, Tenn., is the central organization of the cotton industry, representing producers, ginners, seed crushers, merchants, warehousemen, cooperatives, and manufacturers in 17 cotton-producing States.

If there are specific questions on the extensive research underway which I am going to mention, Dr. Sasser, who is head of cotton dust research at Cotton Inc., is in the room and would be happy to answer them if more details are needed.

Mr. GORE. Fine.

Dr. WAKELYN. My statement, which has already been submitted, contains documentation and information that I think should be useful to this subcommittee. My oral remarks are a brief summary of the statement.

With the permission of the subcommittee, I would like to submit at this time more detailed information as a supplement to my written and oral testimony. Attached to the supplement, there is a listing of the technical papers the supplement contains.

Mr. GORE. Fine. We will receive those for review and we will hold the record open for possible inclusion of that material.

Dr. WAKELYN. I think there are many papers from the medical literature that are included in the supplement to my statement that would be very useful to this committee to consider.

There is much new information available, which OSHA can consider in the new rulemaking on cotton dust. However, the answers to many of the questions concerning byssinosis to which this subcommittee seeks answers are presently not available. But, industry and Government have extensive research underway—including all of the research recommended by the National Academy of Sciences in their thick report. The research is directed toward determining the etiology and pathogenesis of byssinosis and the elimination of the active agents.

Over $8 million per year is presently being spent by USDA and Cotton Incorporated on this research, and should be continued at a high level. I might add now that some of the research people that have been mentioned already today—that have been talked about as being biased for one side or the other, being for industry or whatever—many of these people have been supported by Cotton Inc. and continue to be supported by Cotton Inc.

For instance, Dr. Kaye Kilburn has been supported for a longer time by Cotton Inc. than anybody else they have supported. They support Dr. Battigelli at the University of North Carolina, Dr. Rylander in Sweden, just a few examples, Dr. Nichols in Wales, Dr. Buck at Yale, and so forth.

Mr. GORE. That is most impressive.

Dr. WAKELYN. Many of the major people that are doing research in this country have been supported by Cotton Inc. It is not taking a position. These people are independent contractors. They do the work and they publish it the way they see fit. The contractor only has control over it in that the study protocol is approved before he gives the contract.

Research results indicate that good progress is being made on finding the cause, its method of action, and ways to eliminate the problem.

Washed cotton is a means of eliminating the causative. I serve as the chairman of a Government-industry-union task force on washed cotton evaluation and cotton dust research, made up of representatives from USDA, NIOSH, Cotton Incorporated, the American Textile Manufacturers Institute, the National Cotton Council, and the Amalgamated Clothing and Textile Workers Union. I might add that it may be the only example in this country where union, Government, and industry are working together to try to solve a problem.

This committee coordinates the research efforts on washed cotton and provides a forum for interchange which helps keep the overall research efforts on the right track.

The cotton dust standard should apply only in those workplaces in which a significant health risk can be shown. Accordingly, the standard should not apply to cottonseed oil mills, warehouses, classing offices, waste processing industries—including downstream users of waste, for example, upholstered furniture assembly—and downstream textile processes such as knitting and narrow elastic and rigid fabric production. In these industries, a finding of significant risk as required by the benzene decision criteria cannot be made.

For those sectors where a finding of significant health risk is made, OSHA should evaluate alternate standards so that the most cost-effective standards to protect workers will be promulgated. The workers certainly will benefit from such an approach, particularly in the present economic climate where 15 to 20 percent are unemployed in the textile industry.

For textile mills, all of the new health data should be considered in determining the appropriate standard for the industry. Published data indicate that only a small minority of exposed personnel ever develop byssinosis of any grade, and most of these are smokers; and that byssinosis does not evolve into more advanced stages among nonsmokers. Studies indicate that cotton dust exposure does not cause increased mortality, which is evidence against the occurrence of any serious long-term respiratory impairment due to cotton dust exposure.

Thus, as stated in the National Academy of Science's report and other recent, thorough, authoritative reviews of the medical literature, there is great question concerning the presumed relationship between the acute, reversible state of byssinosis and the chronic, irreversible disease, and the latter's specific relationship to cotton dust. There is also question whether a mild acute effect in workers is a significant risk of material health hazard.

The Yale University study of retired textile workers, sometimes call the Beck study, reported that cotton textile workers suffer more pulmonary problems than did a control group not exposed to cotton dust. This study suffers from many deficiencies which detract sufficiently from the study that a meaningful interpretation of risk from occupational exposure to cotton dust is not possible. These have been enumerated by several of the witnesses today. It has never been published, but when presented at recent technical meetings it has been strongly criticized for its methodology and control population. Thus, the Beck study offers nothing to help answer questions to which this committee seeks answers.

The most recent assessment of control technology for yarn manufacturing performed by Enviro Control, Inc., under a NIOSH contract, and published in 1980, indicates that in the downstream processes of roving, ring spinning, winding and spooling, engineering control technology is limited primarily to general ventilation and air cleaning equipment and adequate application of local exhaust ventilation equipment has not been developed.

Proponents of the current cotton dust standard contend that many mill workplaces are in compliance with the current PEL. What is not said is that compliance has been achieved in many work areas through substitution of synthetics for cotton. This has caused substantial revenue loss to the cotton industry and a substantial denial of choice to consumers.

Since the cotton dust standard was proposed in 1976, the competitive loss of cotton's share of mill fiber consumption is equal to 1.33 million bales annually, which is equal to an annual revenue loss to growers and handlers of over $500 million. The revenue loss from fiber substitution was never considered by OSHA in the rulemaking, and it cannot be ignored in proper assessment of an economically feasible, cost-effective standard. The workers and the American consumer would be better served by a cost-effective standard that would allow consumer demand and market economics to determine what fibers are consumed in the domestic market.

Finally, for some reason and without any substance, some content that if a study is sponsored by industry it is biased and should be discounted. On the other hand, if unions or Government sponsor a study, it is pristine. I might add that the unions have not sponsored any of the research, as industry and the Government has done. As I said earlier, over $8 million in research programs is currently underway. Studies should be judged on their own merits and critiqued with substantive comments rather than invective and innuendo. We have high hopes that this subcommittee will review the information presented at this hearing with objectivity.

There is one other comment that I would like to make. The number that has been mentioned at this hearing for the number of people that are actually exposed to cotton dust—something in the neighborhood of 600,000—is something that cannot withstand any scrutiny. The total number of workers presently employed in the textile industry dealing with all types of fibers is no more than about 600,000, with almost 20 percent unemployed. The amount of workers actually dealing with cotton is probably something in the neighborhood of 100,000, maybe even slightly less than 100,000.

If you look at actual data that have been obtained through medical surveillance information by the ATMI, you obtain a figure of something like less than 1,000 that actually have any grade of byssinosis.

I will be happy to answer some questions.

[The prepared statement of Dr. Wakelyn follows:]

STATEMENT OF THE NATIONAL COTTON COUNCIL OF AMERICA TO THE INVESTIGATIONS AND OVERSIGHT SUBCOMMITTEE, HOUSE COMMITTEE ON SCIENCE AND TECHNOLOGY

SEPTEMBER 22, 1982

The National Cotton Council of America (NCC), with headquarters in Memphis, Tennessee, is the central organization of the American cotton industry, representing producers, ginners, seed crushers, merchants, warehousemen, cooperatives, and manufacturers in the 17 cotton-producing states.

The purpose of this statement is to provide the Investigations and Oversight Subcommittee with information on the state of knowledge regarding byssinosis in the cotton industry.

COTTON DUST/BYSSINOSIS RESEARCH

The answers to many of the questions concerning byssinosis that this subcommittee seeks answers to are not presently known. However, industry and government have had extensive research programs underway for the last 10 years directed toward determining the etiology and pathogenesis of byssinosis and the elimination of the causative agent.

For the long-term solution to the problem, research is the answer. The level of funding by government and industry for each of the last two years has been over $8 million. Included in this is $975,000 of special USDA appropriation for washed cotton research, which has potential for elimination of the problem.

The extensive USDA program of about $5.3 million has been undergoing redirection changes that should improve an already good program. Both USDA and Cotton Incorporated, which has spent over $10 million on contract research since 1971, continue to support very important projects which are helping to define the nature of byssinosis, on finding the causatives, and on elimination of the problem.

There is an Industry/Government/Union Task Force on Washed Cotton Evaluation/Cotton Dust Research which is made up of representatives from USDA, NIOSH, Cotton Incorporated, American Textile Manufacturers Institute, National Cotton Council, and the Amalgamated Clothing and Textile Workers Union. This committee coordinates the research effort on washed cotton and provides a forum for interchange which helps keep the overall research efforts on the right track.

Many of the scientists doing the research on different approaches toward defining the nature of byssinosis and on finding the causative agent or agents presented papers at the Cotton Dust Research Conference held at the Beltwide Cotton Research Conference in January 1982. This is the sixth year the National Cotton has sponsored a special conference on cotton dust research as part of a continuing effort in documenting and disseminating facts on byssinosis and expanding research efforts.

Recent research results indicate there are washing treatments which show promise and cotton fractions have been isolated which appear to cause worker reactions. So research results indicate good progress is being made on finding the cause, its method of action, and ways to eliminate the problem.

Essentially all of the research that shows promise on causative agent and the mechanism of the development of the disorder is being funded by Cotton Incorporated and USDA. This shows the great importance that the cotton industry places on finding a solution to this problem and on providing a safe and healthful workplace for all of its employees.

More detailed information on recent research by Cotton Incorporated and USDA will be submitted for the record.

HEALTH EFFECTS IN THE NON-TEXTILE INDUSTRIES[1]

Because the cotton dust standard, as promulgated, has no logical beginning and end points, workplaces in at least 35 different industries -- many inadvertently without any information -- apparently were covered by OSHA under the new general industry cotton dust standard promulgated in June 1978.

In light of the U. S. Supreme Court's ruling in the benzene case, as a prerequisite for promulgation of a standard, OSHA must find as a threshold matter that the substance to be regulated poses a "significant risk" to employees present in the workplace and that a new, lower standard is "reasonably necessary or appropriate" to eliminate or lessen such risks. *Industrial Union Department*, AFL, CIO v. *American Petroleum Institute* 448 U. S. 607, (1980)--hereafter "the benzene case," "the benzene opinion" or "benzene."[2] Accordingly, the cotton dust standard should apply only in those workplaces in which a significant health risk can be shown.

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[1] OSHA defines non-textile industries as all industries where cotton is processed or handled except textile mills and weaving operations.

Cottonseed Oil Mills

The general industry cotton dust standard was made applicable to the cottonseed processing industry despite (a) the absence of data in the record showing any material health impairment among the industry's workers,[3] and (b) economic impact data showing that the standard's compliance cost would shut down

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[2] The benzene case had not been decided when the U. S. Court of Appeals for the District of Columbia Circuit upheld the cotton dust standard for all industries initially covered except (a) oil mills, for which the standard was remanded because the agency had not shown it to be economically feasible, and (b) the waste industries, for which the standard's applicability had been earlier severed for separate consideration. Subsequently, the warehouse and classing office sectors were remanded to OSHA for further consideration by the U. S. Court of Appeals for the District of Columbia Circuit (February 3, 1981). On February 16, 1982, OSHA filed a motion with the D. C. Court asking that the entire case for oil mills, warehouses, classing offices and waste industries be remanded. On March 30, 1982, the court remanded the waste industry record to OSHA and reaffirmed the remand for the oil mills, warehouses, and classing offices but retained jurisdiction over the case.

[3] The only information relevant to U. S. cottonseed oil mill workers was a study by H. Weill and L. Jones, "Report on the Evaluation of Respiratory Effects of Cottonseed Dust Inhalation" (1976, Ex. 6 (68)). This study found a "byssinosis prevalence" typical of what would be expected in an unexposed population (i.e., no abnormal byssinosis) and a chronic bronchitis prevalence even lower than would be expected in an unexposed population. The record also contains three foreign studies (Ex. 128K, 128M and 6(70)). None of the foreign studies examined conditions similar to those in the U. S. oil mills. Australian and Egyptian mills had dust levels much higher than those in the U. S. and involved more manual labor and different job functions (see Ex. 153 at 33-36 for a description of the differences). NIOSH condemned the foreign studies and contended that they could not be used to support a standard in the U. S. cottonseed oil mill industry (Ex. 98).

62 of the 83 active plants.[4] On judicial review, the court remanded the record to OSHA for reconsideration on the issue of economic feasibility. *AFL-CIO* v. *Marshall*, 617 F.2d 636 (D.C. Cir. 1979). Subsequently (February 16, 1982), OSHA asked the court to remand the entire case. On March 30, 1982, the court reaffirmed the remand but retained jurisdiction over the case.

The court had upheld OSHA's finding of a risk of material health impairment. It was a finding which the agency inferred from (a) data for other, unrelated industries, and (b) "some evidence" of "less severe" impairment among oil mill workers. *AFL-CIO* v. *Marshall*, 617 F.2d at 666-67. So OSHA has never made a risk assessment as required by the benzene decision and the data in the existing record cannot support a finding of risk using those requirements. OSHA has effectively acknowledged this by asking for the entire case to be remanded for consideration.

Since the cotton dust hearing, Dr. Weill's group at Tulane University School of Medicine has published three papers dealing with their cross-sectional epidemiological studies in cottonseed oil mills conducted in 1975, 1977, and 1978;[5] their fourth study conducted in 1980 is not yet published, but a copy of the findings has been submitted to OSHA.[6] These cross-sectional prevalence studies provide longitudinal data on the health effects in cottonseed oil mills.[7] In addition to the studies by Dr. Weill's group, Dr. Noweir has published a paper on his further studies in Egypt[8] and NIOSH has conducted a cross-sectional epidemiological prevalence study of 723 workers in 18 U. S. cottonseed oil mills, the draft report of which was given to OSHA in August 1982.[9] (The final report was submitted in the middle of september 1982.) The NIOSH study was started in August 1978 with data collection completed in June 1980.

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[4] "The Economic Impact of Proposed Cotton Dust Standards on the Cottonseed Processing Industry," Development Planning and Research Associates, Ex. 93i.

[5] (1975 study) Jones et al., Respiratory Health and Dust Levels in Cottonseed Mills, Thorax, 32, 281-86, 1977; (1977 study) Jones et al., Interaction of Atopy and Exposure to Cotton Dust in the Bronchoconstrictor Response, Brit J. Industrial Med. 37, 141-146, 1980; (1978 study) Jones et al., Respiratory Health in Cottonseed Crushing Mills, Chest, 79S, 30S-33S, 1981 (Supplement).

The data and interpretation of the 1975 study by the Weill group is part of the hearing record as (Docket H-052) Ex. 6(68) and is referred to in footnote 2. The 1977 study was a follow-up on three of the four cottonseed mills already studied and a new study of a larger mill. Two hundred fifty-five workers were studied, some of whom had been previously studied in 1975. No unexposed comparison group was studied. The prevalence of byssinosis (by the Schilling definition[10]) was 1.6%[11] and chronic bronchitis was 7.5% (as compared to 2.3% and 4% in the 1975 study).

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[6] OSHA Ex. 175-12, Docket H-052C, contains copies of all 4 studies.

[7] OSHA Ex. 175-82, Docket H-052C.

[8] Noweir, Some Observations on Epidemiologic Studies in Egyptian Cotton Pressing Plants and Cottonseed Oil Extraction Plants, Chest, 79S, 15S-20S, 1981 (Supplement).

[9] NIOSH Supporting Statement: Characterization of Byssinosis in Segments of the Cotton Industry - Mattress and Cotton Batting, Cottonseed Oil, Waste Recyclers, Cotton Warehouses and Cotton Classification Offices, OSHA Ex. 98. This was adopted as a final protocol. The purpose of the study is to generate data that will be used by OSHA to determine if standards are necessary. The new NIOSH prevalence studies were carried out under this protocol. Information on number of workers and mills studied are from Dr. Mark Carlson, principal investigator on the project.

In 1978, the four mills studied in 1977 were surveyed again. The data from 1975, 1977 and 1978 studies were pooled for the purposes of analysis. In the course of these studies, health data were collected on a total of 444 different subjects (some had been studied several times). The prevalence of byssinosis (again by the Schilling definition) was 2.5%. (The level of chronic bronchitis was not reported.) Therefore, the latter two studies found the same as the first study--a "byssinosis prevalence" typical of what would be expected in an unexposed population and a chronic bronchitis rate lower than would be expected in an unexposed population.

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[10] Schilling et al. A report on a conference on byssinosis. In: Proceedings of the 14th Int. Conf. on Occupational Health, Madrid, 1963. Excerpta Medica Int. Congr. Series, 1963; 62:137-44.

[11] Investigators have found that a finite number of workers exhibit "false positive" responses (unexposed workers giving positive responses to questions) to a byssinosis questionnaire. In his study of workers in a plant processing only synthetic fibers and wool (which do not induce byssinotic symptoms), Dr. Weill found a 2.6% byssinosis prevalence among non-smokers and a 3.2% prevalence among smokers. (Weill, et al., "Report to the American Textile Manufacturers' Institute on Study Entitled Assessment of Respiratory Responses in Textile Workers Exposed to Low Levels of Cotton Dust," May 31, 1976, Ex. 13A). Weill's figure for false-positive responses is close to that submitted by Dr. Merchant, OSHA's expert on health effects among textile workers (Ex. 6(51)). Although Dr. Merchant's empirical data for false positives was 0.75%, his data demonstrates that the prevalence of positive responses for the 528 men working in a plant processing only synthetics and wool was 1.5%, while the prevalence for similarly situated women was 0. Since only men are currently working in the production areas of oil mills, this data indicates that a more accurate figure for comparison is 1.5%. Dr. Solomon Hersh used Dr. Merchant's actual group of workers and, by employing a standard technique in probit analysis, calculated the value for false positives at 2.34%. (Statement of Solomon P. Hersh, Ph.D., North Carolina State University, Ex. 58). Thus, the prevalence of byssinosis which was found in oil mill employees would not be unusual for unexposed employees.

For estimation of longitudinal changes in lung function, these four studies were combined (see Ex. 175-82, OSHA Docket H-052C; "Longitudinal Change in Lung Function of Cottonseed Oil Mill Workers," R. N. Jones et al., Tulane School of Medicine). It is recognized by the authors that this is not a definitive study, but it is, however, the only longitudinal data available for the cottonseed oil mill industry. The report showed:

> "Longitudinal data, drawn from repeated cross-sectional surveys, is available for a cohort of 98 cottonseed oil mill workers followed for an average of 23 months. Mean annual declines were: FVC = -37 ml/yr, FEV_1 = -31 ml/yr, and isovolume FEF_{25-75} = -47 ml/sec/yr. For each test, declines were largest in smokers, less in ex-smokers, and lease in never-smokers. Subjects allergic to multiple common environmental antigens had larger annual declines in FEV_1 and i-FEF_{25-75}. Additional skin test reactivity to cottonseed or cotton dust antigens was associated with even larger declines in i-FEF_{25-75}. No meaningful correlations were found between annual change and measured dust levels or qualitative dust categories; nor between annual change and acute change in lung function across the working shift."

Thus, this study indicates that oil mill workers are suffering no long-term adverse respiratory health effect from their working environment, i.e., no significant risk of a health hazard was shown.

As a follow-up to his 1968 survey, in 1978 Noweir studied nine gins and two "cottonseed oil extraction plants." In the 1968 paper (OSHA Ex. 128K), Noweir indicates that cottonseed oil extraction industry workers are exposed to dust that is mostly "plant debris," even though the cottonseed[12] is obtained from ginning[13] in bags after live steam sterilization. In 1978 the processes at the Egyptian oil mill still appeared to be very dusty, highly manual, and quite different from U. S. oil mills.

In the 1978 Egyptian study, the prevalence of byssinosis among 71 workers in cottonseed handling operations was 0%; among 196 workers in grinding and oil extraction, it was 1% (2/196). The prevalence of chronic bronchitis for cottonseed handling workers was 30.9%, for grinding and extraction workers, 11.7%, and for 120 controls, 14.2%. Compared to controls, cottonseed handling workers had significantly higher prevalences of chronic bronchitis. However, they were exposed to high dust levels but they did not acutely respond to the dust--i.e., they did not have byssinosis. Moreover, U. S. seed handling operations greatly differ from these manual,[14] almost primitive, operations and Noweir's findings are in no way indicative of what might be expected in U. S. cottonseed oil mills.

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[12] The varieties of cotton grown in Egypt are usually smoothseed, i.e., they essentially do not contain linters and are not delintered at the oil mill. Ginning removes the fiber; there are no linters to remove.

[13] Highly manual operations including "farfara." From Noweir's comments (Ex. 128K), much plant debris accompanied the seed to the oil mill.

[14] In Egypt, seeds containing much plant debris are manually dumped from bags into buckets into conveyors (Ex. 128K). In the U. S., seed arrive in trucks and are dumped directly into a non-work area. Workers for the most part are never in contact with the seed (Ex. 153C, 33-36).

The NIOSH cross-sectional epidemiological study of cottonseed oil mill workers was submitted to OSHA in August 1982 (see OSHA Ex. 175-56, Attachment F, Docket H-052C; "Respiratory Disorders and Dust Exposure in Sectors of the Cotton Industry of the United States, Part 3, Cottonseed Oil Mills"). It found "...no significant excess prevalences of bronchitis or byssinosis in oil mill workers compared to controls," and, "Analysis of lung function and symptoms to detect dose-response relationship gave mixed results, with no clear trends or significant associations." Since NIOSH presented a negative medical survey, i.e., they found no acute or chronic problem and no dose-response relationship, the report provides no basis for a showing of a significant health hazard in this industry. Indeed it strongly indicates that no standard is necessary and that oil mills should be exempt from any cotton dust standard.

Since the existing OSHA record (for the 1977 hearings) will not support the requisite threshold finding of significant risk, nor does the new published data, cottonseed oil mills should be exempt from the cotton dust standard.

Cotton Warehouses and Cotton Classing Offices

OSHA made the standard applicable with no record support for a finding that workers in these sectors are subject to a significant health risk.[15] On review, the Court of Appeals for the District of Columbia Circuit nevertheless affirmed the standard for the warehouse industry. However, the agency subsequently acknowledged that its health-risk finding for warehouses and classing offices might be flawed. Responding to Petitions for a Writ of Certiorari, the agency said:

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[15] Byssinosis has never been documented or diagnosed in any form among cotton warehouse workers. The only medical evidence in the record (Ex. 56 and 95e) did not find a single case of byssinosis among 70 workers studied. The record contains no reports in the published literature regarding the respiratory effects of dust in cotton classing rooms.

> 4. Petitioners in No. 79-1789 contend (Pet. 9-11) that there is insufficient evidence to support the Secretary's determination that employees exposed to cotton dust in cotton warehouses and cotton classing offices may suffer a material impairment of health. There is no need for the Court to consider this issue at this time.
>
> In light of this Court's decision in *Industrial Union Dept., AFL-CIO* v. *American Petroleum Inst.*, Supra, the Secretary has decided to reexamine and reconsider the cotton-dust standard as it applies to these two non-textile industries... At the same time, the Secretary has suspended the effectiveness of the standard for these industries pending this reexamination.[16]

On October 6, 1980, the Supreme Court entered the following order:

> The petition for a Writ of Certiorari is granted. The judgment is vacated and the case is remanded to the United States Court of Appeals for the District of Columbia for further consideration in light of *Industrial Union Dept., AFL-CIO* v. *American Petroleum Institute*, 448 U. S. 607 (1980).

On February 3, 1981, the record was remanded to OSHA

(Footnote [15] cont'd.)
Dr. Bouhuys indicated that there was no evidence that byssinosis has ever occurred among persons involved in merchandising cotton (Ex. 11). In a classing room, which is actually part of a business office suite, no bales are handled and no mechanical processes are involved.

[16] Brief of the Federal Respondents on Petitions for a Writ of Certiorari to the United States Court of Appeals for the District of Columbia Circuit, pp. 10-11.

by the D. C. Court. On February 16, 1982, OSHA asked the U. S. Court of Appeals for the District of Columbia Circuit to remand the entire case for their reconsideration. On March 30, 1982, the court reaffirmed the remand but retained jurisdiction over the case.

Since the cotton dust hearings, Dr. Barman has published his study of warehouses,[17] the results of which are already in the hearing record (as OSHA Ex. 56 and 95e). Also, NIOSH has conducted cross-sectional prevalence studies of 512 workers in 18 compress/warehouses and of 609 workers in 13 USDA cotton classification offices;[18] these studies were sent to OSHA the middle of September 1982 (last week). The NIOSH study of warehouses started in the fall of 1978 and data collection was completed by early 1980 (crop year 1979). The NIOSH study of USDA classing offices started in July 1978 and was finished in 1980. Both of these studies according to NIOSH are negative studies. For compress/warehouses, no significant acute or chronic respiratory problem was found; no dose-response relationship was found. For cotton classification office workers, NIOSH found "no evidence of adverse health effects."

Because the existing OSHA record and all new studies will not support a threshold finding that warehouse and classing office workers are exposed to a significant health risk, these industries should be exempt from the cotton dust standard.

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[17] Barman, "Prevalence of Respiratory Disease in a Cotton Compress and Warehouse, A Preliminary Survey," Journal Occup. Med. 21, 273-275, 1979.

[18] "It should be noted that a USDA cotton classing office differs from a merchant's classing office in that it is much bigger, classes many more samples in a day, and that workers work all day at one job rather than only a part of the day.

The Cotton By-Products or Waste Industries

The principal operations in the waste industries are (a) recycling/utilization,[19] the processing of cotton waste materials for resale and reuse in products manufactured by others, (b) garnetting,[20] the forming of webs or batts from waste materials (received from waste recycle operations) to be used in mattress assembly, upholstered furniture assembly, automotive uses, etc., and (c) the spinning of yarns[21] (waste spinning) from waste fibers (received from waste recycle operations) to be used in such operations as mop assembly (see Diagram No. 1). These operations[22] were initially covered by the general industry standard even though the record contains no health evidence directly relevant to domestic waste recyclers; the record evidence for garnetters is inconclusive by the authors' own admissions; the record contains no health evidence relevant to U. S. waste spinning operations; and the record was devoid of any health data for the downstream assembly operations and incidental users of waste products.

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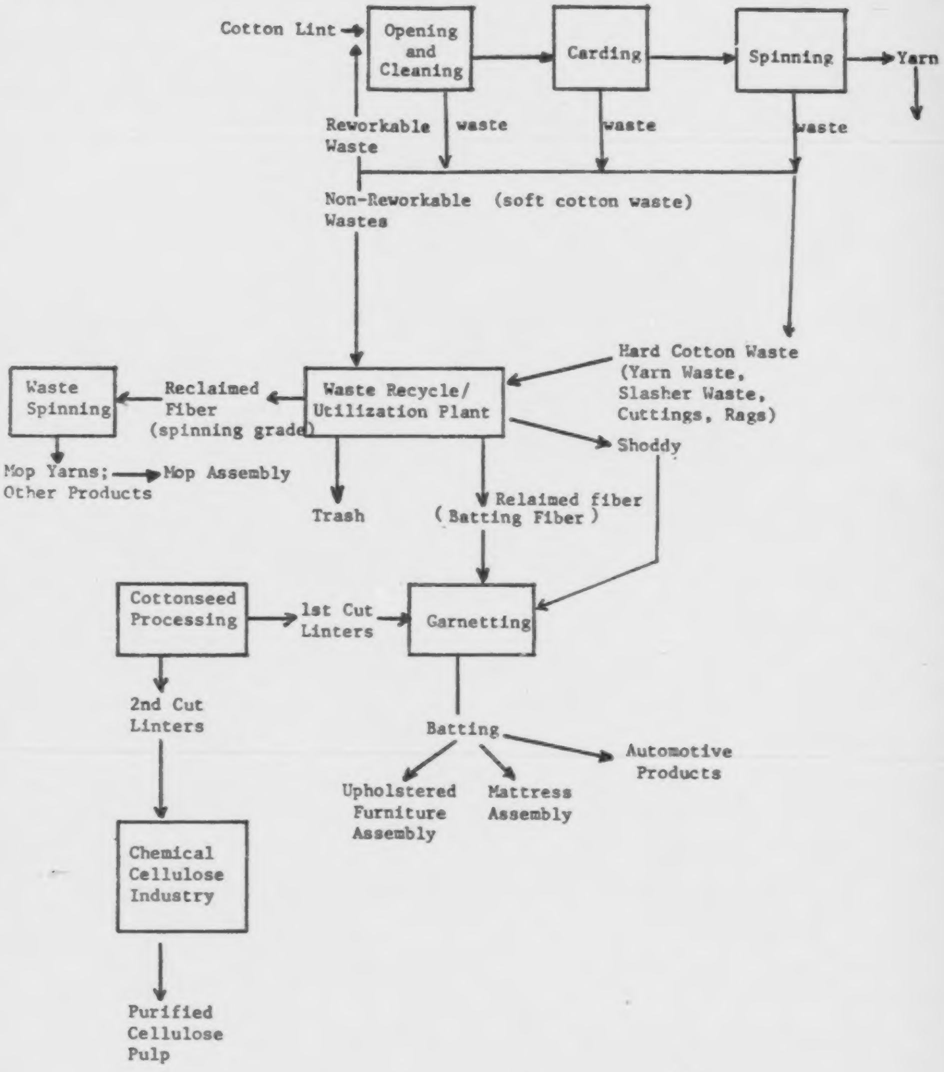
[19] SIC 2294, Processed Waste and Recovered Fiber and Flock.

[20] SIC 2293, Paddings and Upholstery Fillings.

[21] SIC 2299, Textile Goods, NEC.

[22] e.g., SIC 2512, Upholstered Household Furniture, SIC 2515, Mattresses and Bedsprings, SIC 2392, House Furnishings Except Curtains and Drapes(Mops).

DIAGRAM NO. 1


Cotton Lint
Opening and Cleaning
Carding
Spinning
Yarn
Reworkable Waste
waste
waste
waste
Non-Reworkable Wastes
(soft cotton waste)
Hard Cotton Waste (Yarn Waste, Slasher Waste, Cuttings, Rags)
Waste Spinning
Reclaimed Fiber (spinning grade)
Waste Recycle/ Utilization Plant
Shoddy
Mop Yarns; Other Products
Mop Assembly
Trash
Relaimed fiber (Batting Fiber)
Cottonseed Processing
1st Cut Linters
Garnetting
2nd Cut Linters
Batting
Automotive Products
Upholstered Furniture Assembly
Mattress Assembly
Chemical Cellulose Industry
Purified Cellulose Pulp

The only epidemiological study[23] in the record involving waste recyclers was done in Great Britain where workers were exposed to dust levels 200 times the permissible limit (average dust concentration of 108 mg/m^3 with a personal sampler) specified in the stayed U. S. standard. Even at those very high dust levels, only three workers out of 60 had minimal byssinotic symptoms (grade ½). The authors noted that a likely explanation for these findings is that the dust in willowing (waste recycling) work areas "no longer contains the causative agents of byssinosis..." The authors also reported that a search of 15 years of compensation awards by the British Pneumoconiosis Medical Panel found a "remarkably low" byssinosis incidence of only 0.1% in this industry.

In 1978, NIOSH conducted a cross-sectional epidemiologic study of byssinosis and other respiratory abnormalities in the cotton waste recycle/utilization industry with cooperation of the industry. All of the 260 workers in the 13 waste recycle/utilization plants in the U. S. that process cotton waste or cotton/synthetic blend waste were studied. The final report was entered into the OSHA record for Docket H-052C in response to OSHA's February 9, 1982 (47 FR 5906) advance notice of proposed rulemaking on April 2, 1982, as OSHA Ex. 175-56, Attachment B.

This document has been reviewed for the industry by

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[23] "Airborne Dust, Its Protease Content and Byssinosis in 'Willowing' Plants," Chinn, et al., 19 Ann. Occup. Hyg. 101-8 (1976), Ex. 99f.

Dr. Robert Jones, Associate Professor of Medicine, and Dr. Hans Weill, Professor of Medicine, Tulane University School of Medicine, and Dr. Mario Battigelli, Professor of Medicine, University of North Carolina School of Medicine. Main points of their reviews:

1) The NIOSH report makes the observation of "chronic bronchitis" in employees of "less than two years of employment" in the specific environment, and says this is causally related to the occupational exposure. "Chronic bronchitis" is universally defined as chronic only when persisting for at least two years, so it must have pre-existed the work with cotton-related materials. The frequency of bronchitis could not be related to dust levels.

2) The report totally neglects the strong socio-economic factors at play in the genesis of chronic respiratory disorders, which are notoriously higher in lower level blue collar workers.

3) Data in the report indicates that longer term (over two years) employees are comparable to the controls in both symptoms frequency and ventilatory performance (both pre- and post-shift), which is reassuring for the health of the exposed workers.

4) The prevalence of byssinosis was similar in cotton workers and controls. Thus, the results are entirely negative with respect to byssinosis in this industry.

5) "Plant effect" was the only significant exposure-related variable; the study fails to show any relationship between level of dust exposure and any response variable.

6) Spirometry data was obtained on Monday (or the first

day of work after a pause) in cotton dust exposed workers, but on other days of the week in control workers. This casts doubts on some conclusions drawn from the data.

Drs. Jones and Weill concluded that no dose-response relationship was demonstrated in waste cotton workers, either in terms of dust level or length of employment; and that the study thus provides no medical evidence on which to base a recommended standard.

Dr. Battigelli concluded that the report from NIOSH does not contribute to the documentation of any chronic effects on respiratory function and on health stemming from the exposure of workers in the cotton waste utilization industry. Therefore, the NIOSH study does not show a significant dust-related health risk in the cotton waste recycle/utilization industry.

The record also contains very little medical information for garnetting workers, and the studies are inconclusive by the authors' own admissions. A 1973 NIOSH industrial hygiene and medical survey observed some reactions to very high dust levels (3.6 to 10.8 mg/m^3) but the authors said "the groups were...too small to yield statistically valid inferences..." Moreover, "no obvious trends manifest themselves."[24]

In a 1977 NIOSH Health Hazard Evaluation involving 54 Stearns and Foster workers (19 garnett workers; 19 quilt and

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[24] NIOSH, An Industrial Hygiene and Medical Survey of the Stearns and Foster Co., Lockland, Ohio (1973), Ex. 38f. Only one worker out of 34 (a heavy smoker) had both objective and subjective symptoms of byssinosis (grade ½ byssinosis and a decrease in FEV_1 greater than 5% but less than 10%).

tape edgers; 16 sorters) the authors found only one worker, a garnett worker, with minimal byssinosis symptoms (grade ½) and he was a smoker. The authors said of the evaluation, "no firm conclusions should be drawn...and no generalization to this segment of the cotton industry should be attempted.[25]

One additional study was conducted in an Australian garnetting plant where 26 workers were exposed to over ten times the dust exposure limit permitted by the U. S. standard (6 to 21 mg/m^3) and they experienced no decline in pulmonary function at dust levels below 6 mg/m^3.[26]

Because of the lack of available information to determine health risk to respiratory disease among garnett workers,[27] NIOSH planned to do a cross-sectional prevalence study of workers in the garnetting industry. However, due to budget problems 1980-81, this study was cancelled--the other five studies in non-textile operations were completed. This suggests that NIOSH did not feel that a risk existed in this industry sector, since the protocol for the studies indicated that information on the health of garnett workers was lacking.

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[25] NIOSH, Health Hazard Evaluation (Report No. 76-73), Stearns and Foster Mattress Factory (Lockland and Mason Plants) Cincinnati, Ohio. Study not available until after promulgation of the cotton dust standard but cited by Assistant Secretary Bingham as a basis for suspending the standard for the waste processing industry and users of cotton batting (43 FR 39087), Ex. 188x.

[26] G. R. Simpson, Exposure to Dust in the Cotton Garnetting Industry, 1 Med. J. Australia 1151 (1970), Ex. 6(71).

[27] NIOSH Supporting Statement: Characterization of Byssinosis in Segments of the Cotton Industry-Mattress and Cotton Batting, Cottonseed Oil, Waste Recyclers, Cotton Warehouses and Cotton Classification Offices, OSHA Ex. 98. This was adopted as a final protocol. The purpose of the study is to generate data that will be used by OSHA to determine if standards are necessary.

A study of 22 waste spinning mills in Great Britain in 1950 (published in 1966) described worker exposure to "high levels of dust."[28] The mills processed previously-spun hard and soft cotton waste from normal textile processing, and raw, unprocessed cotton. The equipment was similar to that found in the yarn preparation areas of textile mills (i.e., opening, picking, and carding machines). Out of 140 operatives, seven were found to have certifiable cases of byssinosis and 35 had symptoms of the disease. However, in view of the preponderance of manual operations (causing abnormally high exposure to dust), the use of "raw cotton" (unprocessed) in addition to previously processed cotton, and the high proportion of plant trash (since the cotton had not been cleaned at the gin), these statistics are not surprising. Indeed, the authors note that the prevalence of byssinosis was significantly less than in the raw cotton industry. The record is devoid of any health data relevant to U. S. waste spinning operations.

In addition, the record is devoid of any health evidence for the downstream assembly operations and incidental users of cotton waste products.

For any of the waste industries, therefore, OSHA cannot make a valid threshold finding of significant dust-related health risks that will withstand scrutiny in light of the Supreme Court's criteria.

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[28] Dingwall-Fordyce, O'Sullivan, "Byssinosis in the Waste Cotton Industries, Br. J. Industr. Med. 53 (1966); OSHA Ex. 6(72), cited at 41 FR 56503 (1976).

On August 25, 1978 (letter from Dr. Bingham, Assistant Secretary of Labor for OSHA to Carl Vogt), OSHA stayed the standard administratively for all cotton waste processing and waste product manufacturing industries (43 FR 39087). The stay related to a study of mattress workers and garnetters which had not been a part of the rulemaking (see footnote 25) and affidavits indicating the standard would lead to substantial competitive losses for cotton waste products. However, the D. C. Circuit, after consolidating all petitions for review into one case, stayed the entire standard on October 20, 1978. The administrative stay was lifted on January 26, 1979 (44 FR 5438). The judicial stay remains in effect today.

On November 1, 1978, the waste industries cases were severed from the main proceedings by the D. C. Circuit. On February 16, 1982, OSHA filed a motion with the court asking that these cases not proceed to briefing or decision and that the case be remanded for reconsideration. On March 30, 1982, the court remanded the record to OSHA but retained jurisdiction over the case.

Because the existing record will not support a threshold finding of significant risk in light of benzene criteria, the waste recyclers, garnetters and waste cotton yarn spinners as well as their downstream customers (e.g., upholstery furniture assembly) should be exempt from the cotton dust standard.

Knitting and Hosiery Industries

The standard was made applicable to knitting and hosiery industries[29] even though the record was completely devoid of any information on health effects of workers in these industries.

In November 1980, the knitting and hosiery industries filed petitions with OSHA asking that OSHA review the cotton dust standard as it applied to their industries. Subsequently, OSHA has administratively stayed the new standard for knitting and hosiery industries (see 47 FR 35255) to review the significance of the health risk in those segments in response to the Supreme Court's decision regarding OSHA's benzene standard, *Industrial Union Department, AFL-CIO* v. *American Petroleum Institute*, 448 U. S. 607 (1980) and in order to review the results of new medical data which has been submitted by the knitting industry.[30]

The medical data described by the report of Drs. Boehlecke and Battigelli (submitted by the knitting industry to OSHA) has been derived from 2,287 knitting room workers. These data are believed to represent the largest data base of this nature on the knitting industry ever gathered. The original textile mill study by Merchant et al., used as the basis for the "general industry" cotton dust standard, was based on data from approximately 843 workers (no knitting employees). The report has a weakness in that it analyzes data that were originally obtained for medical surveillance, not for a cross-sectional epidemiological study. However, this should not negate the strong findings of the study.

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[29] e.g., SIC 2252 Hosiery, Except Women's Full Length and Knee Length; SIC 2253, Knit Outerwear Mills; SIC 2254, Knit Underwear Mills; SIC 2257, Circular Knit Fabric Mills; SIC 2258, Warp Knit Fabric Mills; SIC 2259, Knitting Mills, NEC.

[30] "Boehlecke and Battigelli, "Analysis of Pulmonary Function Data of Knitting Industry Workers," final report submitted to OSHA July 1982.

The final report of Drs. Boehlecke and Battigelli contains a summary on page 35 which is pertinent to OSHA's decision as to how the knitting process should be handled under the cotton dust standard. It reads as follows:

"We analyzed pulmonary function and respiratory questionnaire data collected by six knitwear and six hosiery manufacturers on 2,287 knitting room workers exposed to cotton dust. Current respirable dust levels were reported to be less than 500 $\mu g/m^3$ for all workplaces in the study. We found no excess of chronic cough, chronic phlegm, or mild dyspnea in the knitting workers over that reported for a group of blue collar workers without exposure to respiratory hazards. Prevalence of byssinotic symptoms was less than 2% and was similar to that reported for workers processing synthetic fibers or wool.

"A review of 480 sets of spirometry tracings, approximately 12% of the data, showed 93.5% to be of acceptable technical quality. The decrement of FEV_1 with age for non-smoking knitting workers estimated from a linear regression analysis was similar to that predicted for a healthy non-smoking population. Cigarette smoking was significantly associated with more rapid loss of lung function with age. In linear regression analyses on a subset of 1,396 workers for whom an estimate of years of knitting work was available, no significant effect of duration of knitting work on FEV_1 was demonstrated. The knitting workers had on average a small acute decrement in FEV_1 over the work shift which was similar to that reported for workers processing synthetic fibers or wool.

"Overall, there was little evidence in these data of a significant chronic effect of knitting room exposure on the respiratory system. Determination of whether these findings are applicable to the entire industry may require consideration of additional information regarding the representativeness of the study group."

NIOSH reviewed the Boehlecke, Battigelli study of knitting workers. In this study, as NIOSH states, the authors found that, "In general, the investigators found 'negative' results, i.e., there was no clear and convincing evidence that the knitwear and hosiery workers in this study were subject to adverse health effects due to occupational exposure." Although NIOSH mentioned some shortcomings of the study which the authors had noted, "NIOSH generally concurs with these observations, except perhaps in the interpretation of Table 22." However, for Table 22, NIOSH states, "...the trends seen in this table are small and are probably clinically insignificant..." Thus, NIOSH offers no criticism that would alter the conclusions of the authors.

The report, therefore, does not show any significant health effects/respiratory problems due to employment in the knitting industry. Because of these findings, OSHA should exempt knitting from the cotton dust standard.

Narrow Fabric Production

Narrow elastic and rigid fabric production[31] was covered by the standard even though the record is devoid of any information on the health of workers in this industry.

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[31] SIC 2241 Narrow Fabrics and Other Smallwear Mills.

Narrow fabrics are usually less than one inch in width but can be up to 4 inches, and the fabric could be classified as either elastic or rigid. Narrow elastic fabrics are made using either elastic core-spun yarns, where at least 50% of the yarn is a synthetic or natural elastic fiber,[32] or elastic fibers in a blend with cotton and synthetic fiber (e.g., polyester). The resulting elastic fabric (used in waistbands, etc.) would be at least 50% elastic fiber. The amount of cotton rarely exceeds 25%.

Narrow rigid fabric (e.g., shoelaces, liners for clothes, etc.) are most often cotton/synthetic blends. The cotton content varies from a few percent to 100%, but is rarely above 50%.

There are three types of fabric production/manufacturing operations involved in the production of narrow fabrics (braiding, knitting, and weaving):

1) Braiding: In the production of elastic braid, spun cotton or man-made fiber yarn is received from a supplier, usually in large ball warps weighing from 50 to 500 pounds. The machine used to braid fabric is known as a butt braider. The bobbins are set on vertical prongs which rotate on a circular, horizontal steel plate set in the machine. As the bobbins rotate on the plate, they also spin on their own axes and intertwine among themselves. The yarn, drawn off the bobbins as they move, combined with rubber thread on separate bobbins, is formed into flat

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[32] Natural rubber, Spandex (e.g., Lycra, Glospan, Numa).

or round elastic braid. The particular pattern of interaction, combined with the number of bobbins on the carrier, determines the shape and characteristics of the product.

The actual amount of cotton yarn used in braiding rarely exceeds 25% of the total yarn used, including rubber, in a given operation. Much of the yarn used has been dyed and bleached.

2) Knitting: In the production of warp-knitted elastic fabric, both rigid and elastomeric cotton or synthetic yarns are used. Yarns are generally run lengthwise; the yarn is prepared as warp on beams with one or more yarns for each needle. The fabric is constructed by interlocking a series of loops of one or more of the yarns. The warp knit fabric has a flatter, closer, and less stretchable knit than other types such as weft or jersey knit.

3) Narrow Weaving: In the production of woven elastic fabric, natural rubber and synthetic elastomeric yarns are interlaced with rigid spun cotton or man-made fiber yarns through a weaving process. Often, the elastomeric yarns are covered by rigid cotton or synthetic yarns prior to the weaving process (core-spun yarns). Woven narrow elastic fabrics are produced on needle and gang looms. With needle looms, yarns are fed through two needles which weave the fabric by moving back and forth rapidly -- the edge (selvage) of the fabric is knitted. Gang looms produce many (10 to 20) elastic fabric "strips" or pieces simultaneously, with the independent shuttles moving about one inch and producing very little mechanical action.

Knitting of narrow fabric would be considered a knitting operation and would be covered under the knitting industry stay. The medical data submitted to OSHA for knitting has not shown any respiratory health effects and should lead to the exemption of knitting from coverage under the cotton dust standard.

Braiding, although not technically a knitting operation, offers a type of dust exposure to the worker similar to knitting. Yarn, usually waxed, is used just as in knitting operations. The yarns in elastic manufacture--mostly blends--would usually be less than 25% cotton. Little labor is required, with six to seven employees operating up to 1500 machines. Cleaning of the machines is required only very infrequently, from less than once per week to only when styles or runs are changed every several months. Dust levels would be very low--similar to knitting. Braiding for regulatory purposes should be considered a knitting process and exempt from the standards with the rest of knitting.

Weaving of narrow fabrics is different from the normal weaving of wide fabrics which is covered under the cotton dust standard. Yarns are used with narrow warps (usually less than one inch) and shuttle systems that have very little mechanical action, which produce almost no dust. With regard to worker exposure to dust, narrow fabric weaving is also similar to knitting. It is not labor intensive, cleaning of the machines is infrequently required (usually only when styles or runs are changed) and dust levels are very low (usually below 200 mg/m^3). Needle looms, one of the two fabric production processes, usually produce a half knitted fabric.

Since there is no medical data in the existing record, in fact, no data of any kind, to support a threshold finding of significant health risk in this industry; and these fabric production operations are similar to knitting with regard to worker dust exposure, the narrow fabric production operations--braiding and weaving--should be exempt from the cotton dust standard.

Other Industries

Aside from the SIC codes which constitute the textile manufacturing, cottonseed crushing, warehousing, cotton classing, waste processing, knitting and narrow fabric industries, at least 16 other industries are covered by the standard:

0723	Crop Preparation Services for Market, Except Ginning (Cottonseed Delinting)
2271	Woven Carpets and Rugs
2272	Tufted Carpets and Rugs
2279	Carpets and Rugs, NEC
2282	Yarn Texturizing, Throwing, Twisting and Winding Mills Cotton, Man-made Fibers and Silk
2292	Lace Goods
2296	Tire Cord and Fabric
2297	Nonwoven Fabrics
2298	Cordage and Twine
2299	Textile Goods, NEC (e.g., mop yarns)
2381	Dress and Work Gloves
2392	House Furnishings Except Curtains and Drapes (e.g., mops)
3842	Surgical, Medical Supplies
4011	Rail Industry
4213	Trucking Industry
7399	Business Services (Cotton Inspection Service, not connected with transportation, and cotton sampler service)

The existing record is completely devoid of any information on the health of workers in these industries and others which were arbitrarily covered because of their incidental use of cotton.[33] Clearly, there is no justification for imposing a cotton dust standard on any of these industries. A finding of significant risk cannot withstand scrutiny in light of the Supreme Court's benzene criteria. Accordingly, these industries should be exempt from the cotton dust standard. OSHA should specifically identify any industries and/or workplaces for which a finding of significant health risk can be made.

THE TEXTILE INDUSTRY

The standard's application to the various workplaces in the textile industry[34] should be reevaluated in light of more recent, more accurate, and more extensive medical information than was available during initial rulemaking.[35-39] ATMI will address the health issue as well as others concerning textile mills more specifically. This statement will only discuss several general areas regarding the health issue.

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[33] Not only are there no published studies in the literature regarding the respiratory effects of dust in these industries, there is no history of respiratory disease problems. In addition, the unidentified active agent(s) are most likely processed out in earlier operations and, if present at all, they are in negligible amounts in the materials that are being processed or handled in these industries. Therefore, there is no indication of any kind that the dust in these industries would cause any respiratory problems.

[34] OSHA refers to the textile industry as yarn manufacturing (the process from bale opening through warping) and weaving (the process of slashing and weaving). By OSHA's definition, textile manufacturing apparently includes SIC codes 2211, Broadwoven Fabric Mills, Cotton; SIC 2221, Broadwoven Fabric Mills, Man-made Fiber and Silk; SIC 2281, Yarn Spinning Mills, Cotton, Man-made and Silk; SIC 2284, Thread Mills. Knitting is handled as a "non-textile" operation for compliance purposes (43 FR 27358-60).

Effects of Smoking: Smokers have a greater incidence of byssinosis and loss of ventilatory function at all levels of dust exposure, and also show a greater tendency to develop byssinosis with increasing dust exposure than non-smokers. Among cotton

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[35] Byssinosis: Clinical and Research Issues Report by Division of Medical Sciences, Assembly of Life Sciences, National Research Council-National Academy of Sciences, National Academy Press, Washington, D. C., 1982. This report by a committee of 12 medical doctors and scientists headed by Dr. Jerome Kleinerman of Mt. Sinai Medical Center, New York, among other things says, "...the presumed relationship between acute and chronic disease and the latter's specific relationship to cotton dust remain unresolved." The report says that a predictable relationship with dust dose is not now possible, because of individual differences in reactivity; that the risk of byssinosis differs from one job to another in the textile processing operations; and that there is a "mill factor"--an unexplained variation in byssinosis prevalence between mills.

[36] ATMI Industry Survey of Medical Surveillance Data; data collected by the American Textile Manufacturers Institute and presented to OSHA in January 1982. The data indicates that less than one-half of 1% of the nation's 300,000 active textile workers may have byssinosis.

ATMI Supplemental Comments to OSHA, Ex. 175-60, Docket H-052C, which is a report by Dr. Harold Imbus entitled, "Medical Surveillance Data in the Cotton Textile Industry." Dr. Imbus has analyzed information on 50,945 employees from seven textile mills. Prevalence rates were lower than those reported by Merchant at synthetic/wool mills. Data on that number of workers cannot be ignored by OSHA in its considerations.

[37] Proceedings from the International Conference on Byssinosis held in 1980 by the American College of Chest Physicians, Chest Vol 79, April 1981, Supplement.

[38] Byssinosis, Causative Agent and Clinical Aspects (A Critical Literature Research Review), D. Honeybourne, D. S. Wales and A. Watson, Shirley Institute Publication S.43, Shirley Institute, Manchester, UK, 1982, 178 pages.

[39] Parkes, W. R., Occupational Lung Disorders, 2nd Ed., Butterworths, London, 1982, p. 435-453 (Chapter on Byssinosis).

workers, smokers have significantly more byssinosis of each grade than non-smokers after dust concentration and length of exposure are allowed for.[40-43]

Fox et al.[41] and Berry, Molyneux and Tombleson[42] found that the prevalence of chronic bronchitis (MRC definition) is unrelated to dust concentrations but Merchant[44] concluded that byssinosis and chronic bronchitis (mucus hypersecretion) are both influenced by cotton dust exposure and cigarette smoking. Evidence of bronchitis, however, is not always present.[45] In Australian cotton mill workers, the prevalence of productive cough and impairment of respiratory function was not found to be specifically attributable to exposure to cotton dust and was less than that observed in current cigarette smokers.[46]

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[40] Elwood, Pemberton, Merrett, Carey, and McAulay, Byssinosis and Other Respiratory Symptoms in Flax Workers in Northern Ireland, Br J Ind Med 22, 27-37, 1965.

[41] Fox, Tombleson, Watt, Wilkie, A Survey of Respiratory Disease in Cotton Operatives. Part II Symptoms, Dust Estimations and the Effect of Smoking Habit, Br J Ind Med 30, 48-53, 1973.

[42] Berry, Molyneux, and Tombleson, Relationship Between Dust Level and Byssinosis and Bronchitis in Lancashire Cotton Mills, Br J Ind Med 31, 18-27, 1974.

[43] Merchant, Lumsden, Kilburn, O'Fallon, Ujda, Germino, and Hamilton, An Industrial Study of the Biological Effects of Cotton Dust and Cigarette Smoke Exposure, J. Occup Med 15, 212-221, 1973.

[44] Merchant, Kilburn, O'Fallon, Hamilton, and Lumsden. Byssinosis and Chronic Bronchitis Among Cotton Textile Workers, Ann Intern Med 76, 423-433, 1972.

[45] Imbus and Suh, Byssinosis: A Study of 10,133 Textile Workers, Archs Envir Hlth 26, 1983-191, 1973.

[46] Field and Owen, Respiratory Function in an Australian Cotton Mill, Bull Europ Physiopath Resp 15, 455-468, 1979.

Thus, Parkes[39] in his 1982 review of byssinosis concluded, regarding smoking, that: "It appears, therefore, that even allowing for individuals who leave the relevant textile industry because of respiratory troubles, only a minority of exposed personnel ever develop byssinosis of any grade and that most of these are smokers."

Pathology: No specific abnormalities have been identified.

A post-mortem study (without control cases) of 43 British cotton workers diagnosed as having byssinosis during life revealed, no significant emphysema but a varying amount of centrilobular emphysema and panlobular type.[47] Microscopy showed occasional minimal fibrosis but no granulomas or any other evidence of extrinsic allergic 'alveolitis,' and the pulmonary blood vessels were unremarkable. But mucous gland hyperplasia and hypertrophy of smooth muscle (expressed as the airway wall formed by muscle) were observed in lobar but not in segmental bronchi, a finding consistent with asthma.

A more recent retrospective study of the lungs of 49 cotton textile workers in the U. S. with smoking habits and appropriate control cases revealed a significant association between cotton dust exposure and mucous gland hyperplasia and goblet cell metaplasia, but none with emphysema; nor was there any significant or consistent difference in pigmentation between cotton and non-cotton workers. It was concluded that irreversible airflow obstruction and morphological emphysema in textile workers are most probably related to smoking and not to the occupational exposure.[48]

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[47] Edwards, Macartney, Rooke, and Ward, The Pathology of the Lung in Byssinotics, Thorax 30, 612-623, 1975.

It appears that cotton dust exposure does not cause emphysema. Available data strongly suggests that byssinosis does not evolve into its more advanced stages among non-smokers.[49] Parkes in his 1982 review concluded that: The pathological studies "do not support the notion that irreversible airflow obstruction is an ultimate stage of byssinosis."[39]

Longitudinal Data: The study, "Follow-Up of Active and Retired Cotton Textile Workers," by Beck, Maunder, Schachter and Schilling[50] ("Beck study") compares pulmonary function and prevalence of respiratory symptoms of cotton textile workers from South Carolina with similar data for residents of Connecticut.

Any results from the Beck study must be interpreted in light of numerous reservations about the validity of the study. There are numerous questions about validity of the study design which detract seriously from its scientific value. Current standards of epidemiologic study design and analysis have not been met; few epidemiologists would defend a study of occupational exposure that used word-of-mouth recruitment of workers, or a geographically remote comparison population, or different questionnaires for exposed and unexposed study populations. These deficiencies and others detract so sufficiently from the study that a meaningful quantitative interpretation of the actual or relative risks from occupational exposure to cotton dust is not possible.

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[48] Pratt, Vollmer, and Miller, Epidemiology of Pulmonary Lesions in Non-Textile and Cotton Textile Workers: A Retrospective Autopsy Analysis, Archs Environ Med 35, 133-137, 1980.

[49] Heyden and Pratt, Exposure to Cotton Dust and Respiratory Disease, J Am Med Assoc 244 1797-1798, 1980.

[50] Beck, Maunder, Schachter and Schilling, Follow-Up of Active and Retired Cotton Textile Workers, Report to the U. S. Department of Labor, April, 1981 (OSHA Ex. 170-9, Docket H-052B).

In addition, it is important to note that the workers studied by Beck, et al., were employed in cotton textile mills mainly in the 1940s and 1950s, when cotton dust exposures were much greater and much different than they have been in the last eight years, and before the industry instituted systematic programs of medical surveillance. Therefore, whatever the Beck study might be deemed to indicate about the health status of cotton textile workers whose occupational exposures occurred two, three, and four decades ago has little relevance to the situation of cotton textile workers today.

Further, it should be noted that this study has never been published in the refereed medical literature -- it is only a contract report to the Department of Labor (which "...does not necessarily represent the official opinion or policy of the Department of Labor. The contractor is solely responsible for the contents of this report." [OSHA Ex. 170-9]). It has been presented in several forms at medical conferences -- most recently at the International Conference on Occupational Lung Disease, March 24-27, 1982, Chicago, Illinois -- and severely criticized for its methodology and alleged control population. The "control population" from Connecticut is usually referred to as a bad "comparison population." The original study (Bouhuys, Schoenberg, Beck and Schilling, Epidemiology of Chronic Lung Disease in a Cotton Mill Community, Lung, 154, 167-186, 1977) conducted in the early 1970s was mentioned at the 1977 OSHA cotton dust hearings, in general terms, without a written copy being available for consideration; and put in the record after the record was supposed to have been closed. Therefore, it was not available for official comment during the hearings. The paper was rejected by several medical journals and only published in a journal (Lung) whose editor (Bouhuys) was one of the authors of the paper. Therefore, it appears that the report by Epidemiology Resources, Inc. (OSHA Ex. 175-C3) is the first critical review of the Beck study and should be carefully considered by OSHA and this subcommittee.

Some refer to the Beck study as the only study of retired workers and say it should be considered for that reason. However, if it is a severely flawed, invalid, and misleading study, it is of no use in helping answer the question of long-term (chronic) effects of cotton dust exposure. However, the mortality studies which are discussed next, do give insight into the long-term respiratory impairment or chronic effects of cotton dust exposure.

Mortality/Morbidity Data: Several studies worth considering have been reported that have investigated the effect of cotton dust on the morbidity and mortality of cotton mill workers. In South Carolina, 1,496 cotton mill workers were followed for 22 years;[51] no significant excess mortality was detected, and the mortality pattern by cause was no different from that in the general population. Another study of textile workers in Lancashire, followed up for 12 years, failed to detect any association between byssinosis and mortality.[52] Merchant and Ortmeyer studied two cotton mills in North Carolina and found no significant excesses among non-malignant respiratory causes of death.[53]

Excess mortality due to bronchitis and pneumonia has not been seen in the limited number of studies of mortality in the U. S. textile industry. Enterline and Kendrick[54] studied 6,281 white male cotton textile workers aged 15 to 64 as a control population in an examination of mortality in asbestos workers. Using the U. S. white male population as the standard, a Standardized Mortality Ratio (SMR) ([Observed deaths/Expected deaths] X 100) of 59.4 was calculated for respiratory disease, indicating that respiratory disease mortality in white male cotton textile workers is less than that of the U. S. white male population. This finding was confirmed and extended in a more recent analysis.[55]

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[51] Daum, Seidman, Heimann and Selikoff. Mortality Experience of Cotton Textile Workers in the United States. Proc. of 18th Int. Congress on Occupational Health, Brighton, England, 1975. They found that among 1500 cotton textile workers with 29,595 person-years of observation 1950-1972, 454.37 deaths were expected (taking age, year, and sex into account) and 430 occurred. Neither carding, weaving, spinning, nor other work was associated with unusual mortality experience. The authors concluded that additional observations would be unlikely to reveal altered mortality experience of a magnitude sufficient to be considered a public health problem.

[52] Berry and Molyneux, A Mortality Study of Workers in Lancashire Cotton Mills, Chest 79S, 11S-15S, 1981.

[53] Merchant and Ortmeyer, Mortality of Employees of Two Cotton Mills in North Carolina, Chest 79S, 6S-11S, 1981.

[54] Enterline and Kendrick, Asbestos Dust Exposure at Various Levels and Mortality, Arch Environ Health, 15, 181-186, 1967.

In 1978, 2,528 flax workers seen in 1961-62 were followed up.[56] The follow-up study found no evidence that either exposure to dust or byssinosis had an effect on survival. (The clinical picture in flax workers and in cotton workers appears to be identical.[57])

This is important evidence. Almost any hazard to health will have an effect on survival, and this effect will be detected provided numbers are sufficient. The absence of any effect on survival in these textile workers, once account has been taken of tobacco consumption, is evidence against the occurrence of any serious long-term respiratory impairment. Many studies have shown that both respiratory symptoms and lung function, estimated by forced expiratory volume and forced vital capacity, are sensitive predictors of mortality.[58-61] Most of the evidence relating respiratory impairment to mortality comes from studies of chronic bronchitis; however, it is difficult to envisage any chronic lung disease that is severe enough to cause disability but that does not impair survival.[56] On the other hand, while mortality data might not tell the whole story, they are unbiased and would certainly reflect any significant lung disease.

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[55] Henderson and Enterline, An Unusual Mortality Experience in Cotton Textile Workers, J Occup Med, 15, 717-719, 1973.

[56] Elwood, Thomas, Sweetnam, and Elwood. The Mortality of Flax Workers. Br J Indust Med 39, 18-22, 1982; Elwood, Thomas and Elwood. Mortality of Flax Workers. Lancet ii 747-48, 1981; Elwood, McAulay and Elwood, The Flax Industry in Northern Ireland Twenty Years On, Lancet, May 15, 1982, 1112-1114.

[57] British Occupational Hygiene Society: Committee on Hygiene Standards: Subcommittee on Vegetable Textile Dusts. A Basis for Hygiene Standard for Flax Dust, Ann Occup Hyg 23, 1-26, 1980.

Since byssinosis appears not to cause excess mortality, it is unlikely to cause serious long-term morbidity.[56] Since byssinosis does not appear to cause increase in mortality and morbidity, it raises great question about the significance of a "mild acute" effect; on the link between the acute and supposed chronic states of byssinosis; and, in fact, on whether cotton dust exposure leads to a chronic condition (long-term respiratory impairment) in the absence of smoking.

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[58] Ashley, Kannel, Sorlie, Masson, Pulmonary Function: Relation to Aging, Cigarette Habit and Mortality, The Framingham Study, Ann Intern Med 82, 739-45, 1975.

[59] Cole, Gilson, Olsen, Bronchitis, Smoking and Obesity in an English and a Danish Town: Male Deaths After a 10 Year Follow-Up, Extrait Bull Physiopathol Respir 10, 657-79, 1974.

[60] Higgins, Gilson, Ferris, Waters, Campbell, Higgins, Chronic Respiratory Disease in an Industrial Town: A Nine Year Follow-Up Study, Am J Public Health 58, 1667-76, 1968.

[61] Miller, Jacobsen, Steele, Coalminers' Mortality in Relation to Radiological Category, Lung Function and Exposure to Airborne Dust. Institute of Occupational Medicine, Report No. TM/81/10: 1981.

Other Textile Work Areas

We believe a finding of significant risk is highly questionable for certain textile work areas such as slashing and weaving. Published medical studies indicate only questionable or inconclusive prevalence at best among slashing and weaving workers, and evidence indicates that the active agent(s) has been processed out and, if present at all, is in negligible amounts in these operations.[62] Accordingly, the cotton dust standard should exclude slashing and weaving on the grounds that a valid threshold finding of significant risk cannot be made. This would be consistent with all other countries in the world since the U. S. is the only country that considers weaving as posing a worker health risk.

For those workplaces in which a significant risk is shown, consideration should then be given to the most appropriate and cost-effective way to insure protection. A number of alternative approaches should be evaluated as to their effectiveness.

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[62] All (see e.g., Ex. 6(14), Ex. 6(18) and Ex. 47) but Dr. Merchant (Ex. 6(51) who have conducted studies in slashing and weaving have found a prevalence level no higher than the false positive rate (positive responses to questionnaire by unexposed workers--2 or 3%, (Ex. 13A and Ex. 58)). Even Dr. Merchant's data indicate markedly reduced symptoms from primary textile processing. Merchant's study was very limited; did not take into consideration employee transfer from yarn preparation and production into slashing and weaving; found no prevalence in slashing and did not indicate grades of byssinosis found in weaving (see Ex. 58 and Ex. 54). In addition, analysis of the dust in the atmosphere of a typical weaving room has been demonstrated to be primarily of sizing (usually starch or polyvinyl alcohol) and fiber fragments (Ex. 59), indicating the unidentified active agent(s) are processed out or are in negligible amounts in slashing and weaving operations.

DUST CONTROL TECHNOLOGY FOR COTTON PROCESSING OPERATIONS

The most recent investigation of control technology for yarn manufacturing, knitting, weaving, waste processing, and cottonseed processing started in the fall of 1978 and was completed in 1980 by Enviro Control, Inc., under contract (Contract No. 210-78-0001) from NIOSH. "Control Technology Assessment of Raw Cotton Processing Operations" was made by conducting preliminary and detailed surveys in plants utilizing control technology. A copy of its summary and conclusions will be submitted at the time of the oral testimony.

For cottonseed processing and waste processing plants, dust levels in many areas were above 1000 $\mu g/m^3$ even though engineering control technology was used. And it is not known what dust levels can be reached without further evaluation since technology is lacking for many work areas in these sectors.

For yarn manufacturing, it was concluded among other things that:

- In the early processes of opening, cleaning, picking, carding, drawing and waste collection, local exhaust ventilation, general ventilation, air cleaning technology, and machine enclosure design are being applied to reduce dust emission levels.
- In the downstream processes of roving, spinning and yarn preparation (winding and spooling), engineering control technology is limited primarily to general ventilation and air cleaning equipment. Adequate applications of local exhaust ventilation equipment have not been developed for

these processes. A major problem is the large number of individual emission points that must be controlled. Also, the physical configuration of these machines are not conducive to local exhaust ventilation.

For weaving, the report concluded:

- In weaving and knitting, practical applications of local exhaust air ventilation are not available for use in these operations.

- Analysis of dust samples taken in a weave room that uses an oil mist to lubricate the shuttles showed that the samples collected contained 87% oil.

Thus, the control technology assessment report done for NIOSH by Enviro Control, Inc., and published in June 1980 for release in 1981 indicates that there are work areas in textile mills (e.g., roving, spinning, winding and spooling), as well as in the non-textile industry, where it is not technologically feasible to control dust to the level OSHA mandated.

ECONOMIC DATA

In an effort to determine the number of businesses and jobs affected by the dust standard, the National Cotton Council reviewed all available data from the 1978 Census of Agriculture, the 1977 Census of Wholesale Trade, the 1972 Census of Selected Service Industries, the 1977 Census of Manufactures, the 1979 Agricultural Statistics, and the 1977 Economic Models for Cotton Ginning from the U. S. Department of Agriculture. The results are shown in Table 1. Excluding farms and gins, the standard's coverage extends to an estimated 2,199 businesses and 265,783 workers.

Table 1

Part A

Total

State	Number of Businesses	Number of Jobs	Revenue
Alabama	106	19,071	$ 916,342,000
Arizona	16	603	213,999,000
Arkansas	73	2,795	236,127,000
California	125	2,912	786,478,000
Georgia	161	41,795	1,956,411,000
Louisiana	45	877	330,283,000
Mississippi	102	4,786	779,992,000
Missouri	13	270	65,027,000
New Mexico	10	178	71,428,000
North Carolina	307	72,663	3,139,991,000
Oklahoma	13	256	77,579,000
South Carolina	172	51,092	2,041,389,000
Tennessee	111	5,806	1,656,333,000
Texas	257	6,459	2,740,989,000
Other States	688	56,220	2,315,513,000
TOTAL*	2,199	265,783	$17,328,881,000

* Excludes Farms and Gins

Part B

Total

Sector	Number of Businesses	Number of Jobs	Revenue
Merchants	497	3,622	6,851,181,000
Warehouses & Compresses	326	5,947	168,000,000
Cottonseed Oil Mills	78	5,200	859,200,000
Textile Mills	1,298	251,014	9,451,000,000
Cotton Weaving Mills (SIC #2211)	314	116,800	4,417,200,000
Synthetic Weaving Mills (SIC #2221)	108	36,240	1,518,400,000
Narrow Fabrics (SIC #2241)	89	5,553	182,300,000
Hosiery (SIC #2252)	114	8,856	253,900,000
Knit Outerwear (SIC #2253)	190	12,320	451,900,000
Knit Underwear (SIC #2254)	73	17,953	514,700,000
Cotton Finishing Plants (SIC #2261)	210	20,800	760,100,000
Yarn Mills Except Wool (SIC # 2281)	132	26,754	1,120,700,000
Throwing & Winding Mills (SIC #2282)	6	915	45,100,000
Thread Mills (SIC #2284)	12	2,382	101,200,000
Cordage & Twine (SIC #2298)	50	2,441	85,500,000
TOTAL	2,199	265,783	$17,328,881,000

STATISTICAL SOURCES -- 1978 Census of Agriculture, 1977 Census of Wholesale Trade, 1972 Census of Selected Service Industries, and 1977 Census of Manufacturers, U.S. Department of Commerce; 1979 Agricultural Statistics and 1977 Economic Models for Cotton Ginning, U.S. Dept. of Agriculture.

Table 2
Part A
Total

State	Number of Businesses	Number of Jobs	Revenue	State Taxes
Alabama	2,391	25,624	$ 1,041,523,864	$ 58,638,900
Arizona	1,437	16,545	774,401,189	85,107,438
Arkansas	4,424	17,223	476,868,954	27,234,778
California	4,285	46,088	2,238,607,167	179,312,555
Georgia	1,118	44,483	2,013,487,377	105,305,627
Louisiana	2,834	9,629	599,978,982	21,261,235
Mississippi	5,418	31,093	1,339,309,774	90,433,677
Missouri	1,622	4,540	126,553,856	5,567,726
New Mexico	1,088	4,021	118,417,391	19,539,199
North Carolina	844	74,029	3,156,829,608	149,949,919
Oklahoma	4,461	8,018	268,690,399	16,176,366
South Carolina	719	53,294	2,086,974,740	116,453,197
Tennessee	2,591	11,263	1,723,166,457	66,342,165
Texas	24,546	78,295	4,729,377,991	152,285,444
Other States	744	56,342	2,318,599,000	162,268,000
TOTAL	58,522	480,487	$23,012,786,749	$1,255,876,226

Part B
Total

Sector	No. of Businesses	No. of Jobs	Revenue	State Taxes
Farms	53,863	163,173	$ 5,097,579,000	$ 307,434,000
Gins	2,460	51,531	586,326,749	33,581,406
Merchants	497	3,622	6,851,181,000	329,005,000
Warehouses & Compresses	326	5,947	168,000,000	8,934,000
Cottonseed Oil Mills	78	5,200	859,200,000	52,040,000
Textile Mills	1,298	251,014	9,450,500,000	524,881,820
TOTAL	58,522	480,487	$23,012,786,749	$1,255,876,226

STATISTICAL SOURCES -- 1978 Census of Agriculture, 1977 Census of Wholesale Trade, 1972 Census of Selected Service Industries, and 1977 Census of Manufacturers, U.S. Department of Commerce; 1979 Agricultural Statistics and 1977 Economic Models for Cotton Ginning, U.S. Dept. of Agriculture.

Of course there is no dust standard applicable to farms and farm workers and the cotton ginning industry is not covered by a standard.[63] While cotton farming and cotton ginning operations are not subject to provisions of the general industry standard in question, they are nevertheless affected by the standard's adverse impact on cotton markets. Table 2 shows that, if these sectors are included, the number of businesses affected by the standard totals 58,522 and the number of jobs, 480,487.

Since these numbers are dynamic, they are perhaps somewhat different today than when these measurements were made. For example, the National Cottonseed Products Association indicates that their latest count shows cottonseed oil mills currently number 63 rather than the 78 shown in Appendix A. Also, there is, as of July 1982, 19.3% unemployment in the textile industry.

Proponents of the current cotton dust rule have argued that many textile industry workplaces have been brought into compliance with the current PEL and, therefore, no basis exists for moderating it. What is not said is that many such workplaces were brought into compliance through blending synthetics with cotton. The result was a substantial revenue loss to the cotton industry as well as a substantial denial of choice to consumers. From the time the standard was first proposed, the textile industry has tried to reduce its engineering control costs by substituting man-made fibers wherever possible. There is evidence that the displacement of cotton from this cause has been significant. For example, cotton's share of U. S. mill fiber consumption had stabilized at near 29% for four consecutive years immediately preceding OSHA's announcement of the proposed standard (see Table 3). But immediately following publication of the proposed standard, cotton's share of U. S. mill fiber consumption began to slip. In 1981, U. S. mills consumed 5.67 million bales of cotton. If cotton's share of mill fiber consumption had remained at the 1976 level, consumption would have totaled 7 million bales in 1981. The competitive loss is equal to 1.33 million bales annually which -- based on the average price received by farmers for their cotton in 1981 -- is equal to an annual revenue loss to growers of $428 million for lint[64] and $46 million for seed.[65] And, if one takes the different between the price received by farmers and the mill delivered price of cotton as representative of revenues to handlers and processors, there was an additional revenue loss to these sectors totaling $83 million dollars.[66]

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[63] A standard which OSHA promulgated for the ginning industry was struck down by the Fifth Circuit Court of Appeals. *Texas Independent Ginners Association* et al. v. *Marshall*, 630 F2D 398, 5th Circuit 1980.

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[64] 1.33 million bales x 480 lbs./bale x 67¢/lb.

[65] 1.33 million bales yields 512,894 tons of seed at $90/ton.

[66] Mill delivered price (80¢) minus price received by farmers (67¢) = 13¢ x 1.33 million bales x 480 lbs./bale.

Table 3

U. S. TEXTILE MILL FIBER CONSUMPTION
(Million Bales & Percent)

Calendar Year	Total Bales*	COTTON		MAN-MADE@		SILK & WOOL	
		Bales	%	Bales	%	Bales	%
1970	19.9	7.9	39.5	11.5	57.6	.6	4.7
1971	22.3	8.3	37.0	13.6	60.9	.5	3.8
1972	24.3	8.0	33.0	15.8	64.9	.5	4.2
1973	26.0	7.6	29.2	18.1	69.3	.4	4.3
1974	23.2	6.9	29.7	16.0	69.2	.2	3.7
1975	22.1	6.4	28.9	15.5	69.9	.3	2.2
1976	24.1	7.1	29.2	16.8	69.5	.3	4.1
1977	25.4	6.6	26.0	18.5	72.9	.3	2.7
1978	25.9	6.4	24.5	19.2	74.4	.3	3.1
1979	26.4	6.4	24.0	19.7	74.9	.3	1.1
1980	24.9	6.3	25.3	18.3	73.5	.3	1.2
1981(e)	24.2	5.7	23.6	18.2	75.2	.3	1.2

*Due to rounding, individual numbers may not add to total shown.

@Includes acetate staple and man-made fiber waste.

In addition, depressed prices in 1981 resulting partly from the reduced consumption of cotton, required deficiency payments to cotton farmers totaling $467 million early this year.

The revenue loss to farmers, processors, handlers, and government from fiber substitution was never considered by OSHA in its rulemaking. But this significant cost cannot be ignored in a proper assessment either of economic feasibility or cost-effectiveness.

The interests of cotton industry workers, principals, and American consumers would be better served by a more cost-effective standard that would (1) protect workers, (2) halt the compliance-related substitution of man-made fibers, and (3) allow consumer demand and market economics to determine what fibers are consumed in domestic textile mills.

CONCLUSION

The answers to many of the questions concerning byssinosis to which this subcommittee seeks answers, are presently not available. However, industry and government have had and continue to have extensive research underway to determine the etiology and pathogenesis of byssinosis and to eliminate the active agents. Over $8 million is presently being spent by USDA and Cotton Incorporated on this research. Research results indicate that good progress is being made on finding the cause, its method of action and ways to eliminate the problem.

The cotton dust standard should apply only in those workplaces in which a significant health risk can be shown. Accordingly, the standard should not apply to cottonseed oil mills, warehouses, classing offices, waste processing industries (including downstream users of waste products) and downstream textile processes such as knitting, narrow elastic and rigid fabric production.

For those sectors where a finding of significant health risk is made, OSHA should evaluate alternative standards so that the most cost effective standard to protect workers will be promulgated. The worker will certainly benefit from such an approach, particularly in the present economic climate (15-20% are presently unemployed in the textile industry).

For textile mills, all of the new health data should be considered in determining the appropriate standard for the industry. Data indicate that only a small minority of exposed personnel ever develop byssinosis of any grade and most of these are smokers; and that byssinosis does not evolve into more advanced stages among non-smokers. Studies indicate that cotton dust exposure does not cause increased mortality, which is evidence against the occurrence of any serious long-term respiratory impairment due to cotton dust exposure. There is great question concerning the relationship between acute and chronic disease and the significance of a "mild acute" effect.

The most recent assessment of control technology for yarn manufacturing performed by Enviro Control, Inc., under NIOSH contract indicates that in roving, spinning, winding and spooling, engineering control technology is limited and that adequate applications of local exhaust ventilation equipment have not been developed.

Proponents of the current dust standard contend that many mill workplaces are in compliance with the current PEL. What is not said is that compliance has been achieved in many work areas through substitution of synthetics for cotton. This has caused a substantial revenue loss to the cotton industry and a substantial denial of choice to consumers.

Since the cotton dust standard was proposed in 1976, the competitive loss of cotton's share of mill fiber consumption is equal to 1.33 million bales annually which -- based on the average price received by farmers for their cotton in 1981 -- is equal to an annual revenue loss to growers and handlers of over $500 million. The revenue loss from fiber substitution was never considered by OSHA in the rulemaking and cannot be ignored in proper assessment of an economically feasible, cost-effective standard. The American consumers and the workers would be better served by a cost-effective standard that would allow consumer demand and market economics to determine what fibers are consumed in domestic textile mills.

(P. J. Wakelyn, Ph.D., witness for the National Cotton Council, at the September 22, 1982, hearing of the House Investigations and Oversight Subcommittee)

BIOGRAPHICAL MATERIAL

Phillip J. Wakelyn, Ph.D.
Manager, Environmental/Safety Technology
National Cotton Council of America

Dr. Wakelyn received his B.S. in chemistry from Emory University, his M.S. in textile chemistry from Georgia Institute of Technology, and his Ph.D. in textile chemistry from the University of Leeds (England). He has worked in research in the synthetic fiber industry with Dow-Badische Co. (now Badische Fibers), taught textile chemistry courses at Texas Tech University and was head of chemical research at Texas Tech University, Textile Research Center prior to becoming Manager, Environmental/Safety Technology with the National Cotton Council of America in 1973. At the National Cotton Council, he has been involved with cotton dust (byssinosis), flammability, external emissions, toxic chemicals, and other industrial health and safety problems affecting cotton.

He has been a consultant/expert witness on cotton dust and flammability cases and testified five times at the 1977 OSHA cotton dust hearing representing different sectors of the cotton industry. He is an external advisor evaluator to USDA, ARS, Southern Regional Research Center for cotton dust research programs. He presently serves as chairman of the Government/Industry/Union Task Group on Washed Cotton Evaluation and Cotton Dust Research. In addition, he serves as chairman of the Cotton Dust Research Conference held at the Beltwide Cotton Production Research Conferences, where he plans the conference and edits the proceedings.

Dr. Wakelyn is author of more than 70 technical publications on cotton dust, cotton, wool, textiles and textile finishing and has presented more than 110 seminars and technical papers on cotton dust and textiles.

He is a member of the American Chemical Society, The Textile Institute, American Association of Textile Chemists and Colorists, Sigma XI, The Scientific Research Society, New York Academy of Science, Tennessee Valley Section of American Industrial Hygiene Association, and the American Oil Chemists' Society.

[Because of the voluminous nature of the materials, the following documents are retained in the Subcommittee files and are not reprinted here.]

SUPPLEMENTAL DETAILED TECHNICAL INFORMATION
SUBMITTED TO HOUSE SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT
AS PART OF THE STATEMENT/TESTIMONY OF THE NATIONAL COTTON COUNCIL BY
DR. P. J. WAKELYN, SEPTEMBER 22, 1982

1. Annual Report, 1981, Cotton Dust/Byssinosis Research U.S.D.A., ARS, August 1982
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9. Berry and Molyneux, A Mortality Study of Workers in Lancashire Cotton Mills, *Chest* *79*, 11S-15S, 1981
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12. Elwood, Thomas, Sweetnam and Elwood, Mortality of Flax Workers, *British Journal Industrial Medicine* *39*, 18-22, 1982
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15. Heyden and Pratt, Exposure to Cotton Dust and Respiratory Disease, *Journal American Medical Association* *244*, 1797-1798, 1980
16. Boehlecke and Battigelli, Analysis of Pulmonary Function Data of Knitting Industry Workers, Final Report July 1982 (OSHA Ex. 183, Docket H-052D)
17. Control Technology Assessment of Raw Cotton Processing Operations Final Report, June 15, 1980 (NIOSH Contract No. 210-78-0001), Submitted to NIOSH by Enviro Control, Inc., (Summary and Conclusions, pp. 11-18)

Mr. GORE. Thank you. We will hold questions.

Mr. Scott Hoyman is the executive vice president of the Amalgamated Clothing & Textile Workers Union in New York. Mr. Hoyman, welcome. Please proceed.

Mr. HOYMAN. Thank you, Mr. Chairman.

My name is Scott Hoyman, and I am the executive vice president of the Amalgamated Clothing and Textile Workers Union, AFL–CIO. Accompanying me today are Arthur M. Goldberg and Eric Frumin. I greatly appreciate your invitation to testify at today's hearing on a subject of vital interest to our members, the problem of byssinosis or "brown lung disease," as it is commonly known in the cotton textile industry.

As a union representing tens of thousands of workers in this industry, ACTWU has taken a keen interest in this problem ever since it was first reported in the United States in 1968. In that time we have seen tremendous changes in the working conditions and productivity of our members, in the technology of textile production, and with the passage of OSHA, in the law itself. However, one aspect of the problem has not changed at all.

The spokesmen for that portion of the textile industry yet to comply with the standards continue to deny the abundance of scientific evidence demonstrating the high risk of lung disease faced by textile workers exposed to cotton dust. This denial has encouraged this group of employers to delay those improvements essential to protecting the health of thousands of textile workers.

One would have hoped that with the Supreme Court's decision last year upholding the cotton dust standard, the endless challenges by the industry to this medical evidence as well as their false claims of economic, technological infeasibility would be arrested. Unfortunately, we find ourselves once again forced to refute these claims in order to protect the health of cotton textile workers.

Textile workers labored for so many decades without any real protection against this terrible disease. It has taken years of effort by all the parties to achieve a protective, workable answer, one judged sufficient by the Nation's highest court. We do not believe that reconsideration, much less actual changes, are now appropriate. On the contrary, only good faith efforts to clean up the mills will give textile workers the secure future and health to which they are entitled.

The cotton dust hazard is indeed a serious one. Byssinosis was specifically cited by the U.S. Senate as one of the diseases which should be prevented by the establishment of OSHA. In 1979 the U.S. Department of Labor, in its report to Congress on the byssinosis problem, stated that of the 540,000 workers exposed to cotton dust, an estimated 84,000 have brown lung in varying stages and that at least 35,000 employed and retired workers in the textile industry were permanently disabled. In short, this is a major health problem not only for textile workers and their families but for the industry, the community, and the Nation as a whole.

The need for caution is heightened by the textile industry's periodic offering of studies which purport to show that the cotton dust hazard is minimal or nonexistent. The industry's efforts to obscure the truth began as early as 1964, when Dr. Arend Bouhuys, then at

Atlanta's Emory University, attempted to conduct a Government-funded study of byssinosis among cotton textile workers. The Georgia Textile Manufacturers Association prevented him from obtaining access to the industry. He was therefore compelled to conduct his study of the inmates at the Atlanta Federal Penitentiary's cotton mill, and reported in 1968 that "26 percent of the carding and spinning workers were victims of the disease."

The industry's track record has improved little over the subsequent years. NIOSH recommended in 1974, based in large measure on the work of Dr. Merchant's group, referred to extensively earlier in this hearing, that a new standard be set at less than 200 micrograms of dust per cubic meter of air. Following OSHA's proposal of such a standard in 1976, the medical directors of three major firms testified at OSHA's 1977 hearing regarding the results of their surveillance programs, and their data was pooled by Dr. Imbus, who has also been a witness earlier today, in an attempt to prove that only 1.79 percent of their employees had byssinosis.

Dr. Imbus also concluded that there was no significant difference in the number of byssinosis cases expected at 200 micrograms and at 500 micrograms, in contrast to Dr. Merchant's finding of a doubling of the number from 13 percent at 200 micrograms to 26 percent at 500 micrograms. This pooled study failed to withstand the criticisms of Dr. Merchant and others, and OSHA's negative judgment on the ATMI pooled data was specifically challenged before the court of appeals and was upheld by the court.

The court amplified its opinion on this point by noting that:

> OSHA also criticized the industry studies on a number of other grounds. First, none of the studies had been subjected to peer review through publication in scientific journals. None of them produced dose response data, that is, data charting medical responses to different dust levels. The populations studied may not be representative of the entire affected population, and, finally, the validity of their studies could not be verified because the textile industry declined to furnish the underlying data and in some cases failed to produce the authors of the studies for cross examination at the hearing. Consequently, OSHA concluded that these studies provided insufficient basis for the regulation.

In report after report, ATMI data has been found to be crude, misleading, and meaningless. On April 23, 1982, the ATMI submitted to OSHA the report compiled by Dr. Imbus which was the subject of the earlier testimony today. It is yet another attempt to pool the data from six textile companies and appears to combine the major faults of virtually every previous discredited ATMI effort. The defects were described earlier in this hearing by NIOSH Director, Dr. Millar, and by Dr. Merchant, and we gladly defer to their description.

Suffice it to say that NIOSH has had to go on record for the second time in less than 6 months with a recommendation to OSHA that an ATMI study "be disregarded by OSHA in its rulemaking effort."

Technological considerations: In contrast to their behavior regarding the scientific disputes, many textile companies, large and small alike, have made substantial efforts to reduce the dust in their mills. In reports in 1980 and prior to that date, the Russell Corp., Burlington Industries, J. P. Stevens, all reported substantially complete achievement of the lower dust levels, and several such employers also voluntarily initiated medical surveillance programs prior to 1980. Where these programs are well designed, they can contribute to the identification of some of the workers who have contracted byssinosis in its varying stages, particularly those with longer or higher degrees of exposure. Their importance is continued, moreover, when engineering controls achieve the exposure limits because of the significant risk to worker health which exists at those lower dust levels.

This progress obviously could not have been made without a substantial good faith effort on the part of these employers, particularly in light of the fact that the standard did not begin to take effect until 1980. The full extent of these efforts is clearly reflected in the results of the survey covering 72,500 workers submitted to OSHA by the ATMI last April. In all but one of the textile processes described, covering 98.2 percent of the exposed workers, a majority of the operations had already met the 200-microgram level. In most of the processes surveyed, covering 81.2 percent of the exposed workers, over two-thirds of the operations had already met the 1984 limits.

I might interject, Mr. Chairman, this comment: Some mention has been made in the hearing today in regard to the ability of smaller companies to meet these kinds of exposure limits. I would simply point out that the standard provides that smaller companies or any company, upon the effective date of the standard, may apply for variances. The effective date is still 1984. As far as we know, no applications for variances have been made. Second, there is a specific area of the standard which permits companies that are eligible to apply for Small Business Administration loans if extra capital would be useful in meeting those standards. Therefore, we think that the issue of small business coverage of the standard is one in which there is time for these kinds of enterprises to respond appropriately.

Meeting the cotton dust standard is not just a legal requirement. It also makes good business sense. We have witnessed a remarkable resurgence of investment and innovation in the textile industry in recent years. Productivity levels have soared. If anything, the cotton dust standard has been a stimulant. The ATMI data allow no other conclusion.

Unfortunately, the ATMI has chosen not to adopt the good faith effort of many of these member-companies as a model. Instead, they have engaged in a last-ditch effort to protect the financial interests of those companies which have neglected their responsibilities to invest in modern technology. Those particular company executives who have yet to commit the necessary capital are engaging in more than purely financial calculations. They are also betting on President Reagan and Mr. Auchter to accomplish what they have promised—the deregulation of American industry. In this gamble, they have plainly been encouraged by the ATMI's repeated submission of spurious studies which claim to show the lack of necessity for strict exposure limits.

In conclusion, America's textile workers need the chance to breathe clean air and labor in clean workplaces. They need that chance without further delay or review. They, and the Nation as a whole, deserve as much.

Thank you, Mr. Chairman, for this opportunity. I would be glad to answer any questions.

[The prepared statement of Mr. Hoyman follows:]

TESTIMONY OF

SCOTT HOYMAN, EXECUTIVE VICE PRESIDENT
AMALGAMATED CLOTHING AND TEXTILE WORKERS UNION, AFL-CIO

Thank you, Mr. Chairman. My name is Scott Hoyman, and I am the Executive Vice President of the Amalgamated Clothing and Textile Workers Union, AFL-CIO. Accompanying me today are Arthur M. Goldberg and Eric Frumin.

I greatly appreciate your invitation to testify at today's hearing on a subject of vital interest to our members: the problem of byssinosis -- or "brown lung" disease, as it is commonly known -- in the cotton textile industry. As a union representing tens of thousands of workers in this industry, ACTWU has taken a keen interest in this problem ever since it was first reported in the United States in 1968. In that time we have seen tremendous changes in the working conditions and productivity of our members , in the technology of textile production, and, with the passage of OSHA, in the law itself. However, one aspect of this problem has not changed at all.

The spokesmen for that portion of the textile industry yet to comply with the standards continue to deny the abundance of scientific evidence demonstrating the high risk of lung disease faced by textile workers exposed to cotton dust. That denial has encouraged this group of employers to delay those improvements essential to protecting the health of thousands of textile workers.

One would have hoped that with the Supreme Court's decision last year upholding the OSHA cotton dust standard, the endless challenges by the industry to this medical evidence, as well as their false claims of economic technological infeasibility, would be arrested. Unfortunately, we find ourselves once again forced to refute these claims in order to protect the health of cotton textile workers.

Textile workers have labored for many years without any real protection against this terrible disease. It has taken years of effort by all parties to achieve a protective, workable answer, one judged sufficient by the nation's highest court. We do not believe that reconsideration, much less actual changes, are now appropriate. On the contrary, only good-faith efforts to clean up the mills will give textile workers the secure future and health to which they are entitled.

I. Extent of the Hazard

The cotton dust hazard is indeed a serious one. Byssinosis was specifically cited by the United States Senate as one of the diseases which should be prevented by the establishment of OSHA. In 1979, the U.S. Department of Labor in its report to the Congress on the byssinosis problem stated that of the 540,000 workers exposed to cotton dust, and estimated 84,000 "have brown lung in varying stages," and that "at least 35,000 employed and retired workers in the textile [industry] were permanently disabled. In short, this is a major health problem, not only for textile workers and their families, but for the industry, the community and the nation as a whole.

In describing the extent of the problem, however, we must avoid the temptation to view it only in terms of the numbers involved: to see the forest but not the trees. Such a description makes it too easy to ignore the impact of byssinosis on the individual worker: the painful, hacking cough, denying one the sleep needed after a hard day's work; the shortness of breath so severe that it sends one gasping for breath after walking up a short flight of stairs; the insecurity and improvishment which result from a work life cut short prematurely. The ruination of the lives of textile workers is the byssinosis problem, as much as it is a problem of science, law, economics or technology. The human impact must not be shunted aside as we consider the studies and statistics. Above all, it must remind those who determine the conditions under which we work that human beings are not for experimentation, and that new studies, or proposals for new standards, should be evaluated with the greatest of caution.

II. ATMI Role in Scientific Investigations

The need for such caution is heightened by the textile industry's periodic offering of studies which purport to show that the cotton dust hazard is minimal or nonexistent. The industry's efforts to obscure the truth began as early as 1964, when Dr. Arend Bouhuys, then at Atlanta's Emory University, attempted to conduct a government-funded study of byssinosis among cotton textile workers. The Georgia Textile Manufacturers Association prevented him from obtaining access to the industry. He was therefore compelled to conduct his study of the inmates at the Atlanta Federal Penitentiary's cotton mill, and reported in 1968 that "26% of the carding and spinning workers were victims of the disease."

The industry's track record improved little over the subsequent years. In 1969, we urged the American Textile Manufacturers Institute to cooperate with us in a study of the problem, by independent physicians, but they declined in favor of a study by the industry-oriented Industrial Hygiene Foundation. (Two years later, the IHF reported their finding of a link between dust exposure and lung disease.)

In 1970, Burlington Industries permitted Drs. James Merchant, Kaye Kilburn and others from Duke University to conduct a study of some 3,000 workers. In 1973, the researchers published their finding of a clear "dose-response" relationship between cotton dust and lung disease.

However, notwithstanding Burlington's cooperation with Dr. Merchant that company, Cone Mills and other major textile companies continued to report "studies" by their medical directors which found few cases of byssinosis among their employees. Meanwhile, NIOSH recommended in 1974, based in large measure on the work of Merchant's group, that a new standard be set at "less than 200 micrograms of dust per cubic meter of air."

Following OSHA's proposal of such a standard in 1976, the medical directors of three major firms -- Burlington, Cone and West Point-Pepperell -- testified at OSHA's 1977 hearing regarding the results of their surveillance programs. Their data was "pooled" by Imbus in an attempt to prove that only "1.79%" of their employees had byssinosis. Imbus also concluded that there was no significant difference in the number of byssinosis cases expected at 200 micrograms and at 500 micrograms (in contrast to Merchant's finding of a doubling of the number, from 13% at 200 to 26% at 500.)

This "pooled" study failed to withstand the criticisms of Merchant and others. For instance, when testifying separately, the three medical directors reported finding 430 byssinotics; when pooled by Imbus for the ATMI, only 369 were reported, a discrepancy of 14% which Imbus was himself unable to explain. In view of this and numerous other faults in the ATMI study, OSHA asked the ATMI to make available the raw data upon which the study was based in order to evaluate it in detail. As OSHA explained when it issued the 1978 standard:

> As no party responsible for assembling and pooling the industry data was available at the hearings to explain the ATMI survey,

> questions directed to the sources and validity of the survey went unanswered. An ATMI response to OSHA's request for fuller detail on its pooling resulted in the production of material that by its nature prevented any further critical analysis and failed to dispel the doubt cast on the data by NIOSH cross-examination. Thus, the ATMI data could be accorded only limited significance in the analysis of the health risk at various levels of cotton dust exposure.

The ATMI also retained the services of Dr. Hans Weill of Tulane University in 1976 to study the prevalence of byssinosis at three mills (selected by the ATMI). Weill testified at the 1977 hearing (at OSHA's request) that his analysis showed dust levels were not closely linked to the amount of disease among the workers -- in other words, that Merchant was wrong. Weill recommended a standard of between 200 and 500 micrograms. We asked Dr. John Peters of Harvard University to analyze the raw data upon which Weill's conclusions were based. Not surprisingly, Peters found that Weill had not properly described the workers' exposure to cotton dust. As OSHA concluded in 1978:

> Dr. Peters, using raw data obtained from Dr. Weill, calculated that the prevalence of byssinosis correlates well with dust level.

OSHA's judgment on the ATMI "pooled' data was specifically challenged before the Court of Appeals, and was upheld by the Court:

> . . . OSHA gave serious attention to the medical studies conducted by the textile industry and proffered to support the industry's alternative. These studies purport to show that medical surveillance programs at various textile plants have already afforded workers a level of protection comparable to that offered by OSHA's approach. The record shows that OSHA specifically addressed and scrutinized these studies, and concluded that their validity had largely been discredited. OSHA's judment on this issue is sufficiently supported on this basis.

The Court's amplified its opinion on this point by noting that --

> OSHA also criticized the industry studies on a number of other grounds. First, none of the studies had been subjected to peer review through publication in scientific journals. None of them produced dose-response data, that is data charting medical responses to different dust levels. The populations studies may not be representative of the entire affected population. Finally, the validity of the studies could not be verified because the textile industry declined to furnish the underlying data, and in some cases, failed to produce the authors of the studies for cross-examination at the hearing Consequently, OSHA concluded that these studies provided insufficient basis for the regulation.

The 1977 OSHA hearing also heard testimony by Dr. Bouhuys on the results of his community-based study of byssinois in Columbia, S.C., the only one of its kind which looked at both active workers and retired workers, as well. His findings of byssinosis among large numbers of retired workers, findings which were uncontradicted at the 1977 hearing, showed that any estimates of byssinois drawn solely from studies of active workers were grossly understated. The same conclusion was reached by his colleagues Drs. Beck and Schachter in 1980 after conducting a follow-up study which also found that byssinosis progressed (worsened) in its victims even after they left the mill.

Nonetheless, the ATMI has continued to issue surveys and studies which supposedly show the low rate of byssinosis among the current work force. In report after report, ATMI data has been found to be "crude", "misleading" and "meaningless". For instance, on January 19, 1982, the ATMI widely publicized the results of a survey (conducted by an accounting firm) which allegedly showed that only 4/10ths of one percent of the work force in the cotton textile industry has byssinosis. Three weeks later, Assistant Secretary Auchter announced his plan to review the cotton dust standard, due, in part, to his believe that "there may be new studies to justify reopening the issue of health effects and permissible exposure limits in the textile [industry]." This was despite an announcement by OSHA on January 13, 1982 that "the Agency is not currently considering changes to the current permissible exposure limits" in its review of the cotton dust standard.

In its comments to OSHA on March 26, 1982, NIOSH described this ATMI survey as follows:

> The survey design employed by ATMI violated many basic premises of epidemiology.

* * * *

> It is a rare study in which all pulmonary function tests are acceptable, yet investigators usually mention the extent of their technical problems and the impact on the results. In this survey these issues are not addressed. Until this is clarified, the pulmonary function test data are meaningless.
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> Since the ATMI seems to ignore symptoms and milder pulmonary function abnormalities, it is questionable whether their member companies' surveillance programs are designed in any way to detect early indicators of disease and consequently to take appropriate ameliorative action.
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> * * * *
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> Since age, sex, race, smoking and years of employment are not accounted for in the survey, the rate of prevalence of disease provided by ATMI is extremely crude ... . this crude prevalence is. . . meaningless and cannot be compared to earlier, scientifically valid studies.

NIOSH concluded that the survey "be disregarded as [a] credible scientific investigation of lung disease in the cotton textile industry."

This survey marked a new plateau of self-serving ATMI propaganada. Perhaps in recognition of the ludicrous appearance created by this survey, the trade journal Textile World editorialized that the ATMI's latest effort was comparable to "surveying a bunch of bartenders and asking them how they feel about prohibition." It urged OSHA to use its legal authority to obtain company medical records and conduct its own review of their accuracy.

The ATMI's bias appears to be so ingrained, however, that it is unable to appreciate even such friendly criticism. Almost one month later, the ATMI submitted to OSHA the report compiled by Dr. Imbus which was the subject of the earlier testimony today. It is yet another attempt to "pool" the data from six textile companies, and appears to combine the major faults of virtually every previous, discredited ATMI effort. The numerous defects were described earlier in this hearing by NIOSH Director Dr. Millar and by Dr. Merchant, and we gladly defer to their description. Suffice it to say that NIOSH has had to go on record for the second time in less than six months with a recommendation to OSHA that an ATMI study ". . . be disregarded by OSHA in its rule-making effort."

The ATMI's record speaks for itself. The interests of all parties would be better served by a complete disclosure and an accurate analysis. There is ample precedent for such an approach in Burlington Industries' commendable cooperation with Dr. Merchant and his colleagues 10 years ago, and we would welcome such an approach today. However, until studies such as these are conducted, we strongly oppose the "rush to judgment" which appears to characterize the approaches of the ATMI (and OSHA) in evaluating allegedly scientific evidence of the health risk faced by cotton textile workers. To those who would act precipitously, we ask: What other considerations are so urgent that they merit further delay in implementing protective measures to prevent byssinosis? We know of none, and challenge others to identify them.

III. Technological Considerations

In contrast to their behavior regarding the scientific disputes, many textile companies -- large and small alike -- have made substantial efforts to reduce the dust in their mills. The Russell Corporation reported in 1975 that it had attained "virtually dust-free environments" in several of its yarn plants. Burlington Industries, a traditional leader in the development of engineering controls, reported in 1980 that "more than 75%" of all its cotton workers were exposed to levels below the permissible limits. J.P. Stevens Board Chairman Whitney Stevens, Jr. reported to his stockholders in the same year that they had achieved compliance in over 80% of the affected areas. Similar reports were made by numerous other companies in the same period. Several such employers also voluntarily initiated medical surveillance programs, prior to 1980. Where these programs are well designed, they can contribute to the identification of some of the workers who have contracted byssinosis in its varying stages -- particularly those with longer or higher degrees of exposure. One can appreciate the benefits of these programs in that period when the risks of disease were so high. (Their importance is continued, moreover, when engineering controls achieve the exposure limits, because of the significant risk to worker health which exists at those dust levels. However, the limited usefulness of medical surveillance makes it necessarily a supplement to the primary protective measure -- dust control). This progress obviously could not have been made without a substantial good-faith effort on the part of these employers, particularly in light of the fact that the standard did not begin to take effect until 1980.

The full extent of these efforts are clearly reflected in the results of the survey submitted to OSHA by the ATMI last April. In all but one of the textile processes described, covering 98.2% of the exposed workers, a majority of the operations had already met the 200 microgram level. In most of the processes surveyed, covering 81.2% of the exposed workers, over two-thirds of the operations had already met the 1984 limits.

These survey results demonstrate not only the technical feasibility of the exposure limits, but also the economic incentives of compliance as well. As I am sure the witnesses on the following panel will describe, meeting the cotton dust standard is not just a legal requirement, but it also makes good business sense. Any company which relies exclusively on outdated production machinery has other problems besides the difficulty of installing ventilation equipment: They are unlikely to survive in today's international market place.

We have witnessed a remarkable resurgence of investment and innovation in the textile industry in recent years. Productivity levels have soared. Could this have happened if widespread compliance with the cotton dust standard entailed the burden which the employers have claimed? The fact is that the cotton dust standard has not been a serious hindrance to the industry's modernization plans. If any thing, it has been a stimulant. The ATMI data allow no other conclusion.

Unfortunately, the ATMI has chosen not to adopt the good faith effort of these member companies as a model. Instead they have engaged in a last-ditch effort to protect the financial interests of those companies which have neglected their responsibility to invest in modern technology. Those company executives who have yet to commit the necessary capital are engaging in more than purely financial calculations. They are also betting on President Reagan and Mr. Auchter to accomplish what they have promised -- the "deregulation" of American industry. In this gamble, they have been plainly encouraged by the ATMI's repeated submission of spurious studies which claim to show the lack of necessity for strict exposure limits.

Amercia's textile workers need the chance to breathe clean air and labor in clean workplaces. They need that chance without further delay or review. They -- and the nation as a whole -- deserve as much.

Thank you, Mr. Chairman for this opportunity. I would be glad to answer any questions you might have.

Mr. GORE. Thank you very much.

Dr. Wakelyn, could you explain how you arrived at the figure you used in your oral statement, that there are only 1,000 people in the country who are suffering from byssinosis?

Dr. WAKELYN. I said something approximately under 1,000. If you multiply 200,000, which is a high number, by four-tenths of 1 percent, which is what their actual survey data found, then that is the number that you would get something under 1,000 that actually would have any grade of byssinosis.

Mr. GORE. Do you believe that?

Dr. WAKELYN. That is what the actual data has shown. The ATMI survey is the only measurement of actual prevalence data in the industry. These data were obtained by doing what is required by——

Mr. GORE. Well, no. I mean, there was a figure of 13-percent, I believe.

Dr. WAKELYN. I might add, on a——

Mr. GORE. Didn't OSHA have a 13 percent figure? They have estimated that 35,000 people in the country have byssinosis.

Dr. WAKELYN. No, that is not where that number came from. That is not where 35,000 came from. That came from some paper by Dr. Bouhuys. The 84,000 figure used earlier comes from a report in 1979 that OSHA did for the Congress. But OSHA included every industry sector, like knitting and ginning. Knitting is stayed right now, and there is a study in the OSHA record, which is one of the things I submitted, that shows that there isn't any problem in knitting. OSHA went across the board, using the 13 percent or the higher percent in every industry sector and covering all employees in all industry sectors. That is where the 84,000 figure came from.

The 13 percent comes from Dr. Merchant's data which, as was mentioned, he is on record as saying was done in five Burlington mills that were not even representative of Burlington Industries, let alone of the textile industry.

Mr. GORE. Mr. Hoyman, do you want to comment on that?

Mr. HOYMAN. I would simply say that in our view the major studies, epidemiological studies, and projecting those studies to what we understand is the current population of textile workers exposed to cotton dust—and I would say that Dr. Wakelyn's figure on that population is much lower than what we would expect to find—would disagree with his conclusion by a large margin, that there is less than 1,000 byssinotics in the United States.

Mr. GORE. Therefore, what you have done, Dr. Wakelyn, is taken the 0.4 percent. Is that right?

Dr. WAKELYN. I said if one used those figures, that is what one would come up with.

Mr. GORE. Now where does that 0.4 percent come from?

Dr. WAKELYN. The ATMI information that was submitted from medical surveillance data.

Mr. GORE. Now that was not the——

Dr. WAKELYN. The less than 200,000 figure comes from: if you take the total textile industry——

Mr. GORE. Wait a second. The 0.4 percent, though, is that from Dr. Imbus'——

Dr. WAKELYN. That is.

Mr. GORE. I am not sure you are correct on that.

Dr. WAKELYN. From one of their submissions; it is in their testimony.

Mr. GORE. If I am not mistaken—and I will give you an opportunity to correct the record--that comes from the preliminary survey——

Dr. WAKELYN. Yes, it does come from the preliminary survey.

Mr. GORE. Thrown together by the industry, and contrasts with the figure later arrived at by Dr. Imbus.

Dr. WAKELYN. The later figure he used was 1.9 percent but if you use 2 percent of 200,000, you still get something less than 5,000 people that have any degree of byssinosis.

Mr. GORE. Yes. Now that 2-percent figure is what is so controversial in my mind. You do not share my view on that but let me just explore the problems I have with it. The data has never been made available to anyone. Would you be willing to make that data available for independent review?

Mr. MARTIN. Yes, sir.

Mr. GORE. Mr. Martin, you would?

Mr. MARTIN. Yes, sir. I think that question came up this morning, Mr. Chairman, and we said yes.

Mr. GORE. Good. Now if we want to have someone independently review it for the subcommittee, you have no problem with that?

Mr. MARTIN. No, sir.

Mr. GORE. All right. That is——

Mr. MARTIN. May I make a suggestion?

Mr. GORE. Go ahead.

Mr. MARTIN. I would like to make this suggestion. I do not want to oversimplify this but, by the same token, I think that there has come a time in this controversy when things should be made a little more simple because there has been enough rhetoric and there have been enough inflammatory statements.

By the way, let me correct you on one thing, if I may. There is another thing where industry and the union work very closely and that is the importation of foreign textile products. Is that not right? I am on the committee———

Mr. HOYMAN. We appreciate that comment, Mr. Martin, very much.

Mr. MARTIN. Now let me just say this.

Mr. GORE. Yes.

Mr. MARTIN. One of the main problems that we have had in this from the very beginning is the 180-degree disagreement within the medical profession. I do not claim to be a doctor and I do not think that you claim to be a doctor, but here at this panel earlier this morning we had a 180-degree disagreement. We in the industry hear all this. We do not know, sometimes, whether we are afoot or horseback.

Now the Department of Labor, through its OSHA division, told us "Test your people." They told us how to test them; they told us what to test them with, when to test them. It was a great undertaking for my company, for example. It is very complex, you know, getting people out of the workplace for so many hours.

Now as a result of that test—and I can assure you, in spite of what anybody in this room has said, we did it honestly, with no "vested interest," sir, we did it the way they told us to do it—our results show what Dr. Imbus has reported.

Mr. GORE. What definition of byssinosis did you use?

Mr. MARTIN. Well, I do not know. Could you tell me what definition there is of byssinosis?

Dr. WAKELYN. The definition of byssinosis comes from the questionnaire that is required by the OSHA cotton dust standard. There are standard questions on the questionnaire that one uses to define byssinosis. Bud Imbus outlined those criteria this morning. He said it is all in a computer and those questions produce the byssinosis grade. That is the same way NIOSH has done their cross-sectional studies.

Mr. GORE. Yes?

Dr. WAKELYN. They used the same questions to determine it. That is standard practice for the determination of byssinosis.

Mr. GORE. Now———

Mr. MARTIN. Mr. Chairman, when we got through with our study, I would like to comment, if I may, that no one from the Government has ever looked at our figures.

Mr. GORE. Yes. Well, we would like to get an independent review of them.

Mr. MARTIN. We turned those in. We were one company that turned those in, those figures.

Mr. GORE. OK. I appreciate your institute agreeing to an independent review of the figures. Who were the seven companies?

Mr. **Martin**. I am sorry, I am not privy to that——

Dr. **Wakelyn**. Might I comment on that, Mr. Chairman?

Mr. **Martin**. That was part of 101,000 or 102,000 people——

Mr. **Gore**. Wait a second.

Dr. **Wakelyn**. Mr. Chairman.

Mr. **Gore**. Excuse me just one moment. I will come back.

You are here representing the American Textile Manufacturers Institute. I am sure that some of your staff knows who the seven companies are.

Mr. **Martin**. Burlington Industries, Cone, WestPoint Pepperell, J. P. Stevens, Cannon Mills, Fieldcrest, and Dan River. Those were the seven, sir, but let me just say this: There were many more of us that were in the other study, too. Our company's name is not in here, but we participated as part of the 150,000 people in the first questionnaire who make up most of the working force of the textile industry which the OSHA standard is designed to protect.

Mr. **Gore**. Fine. Dr. Wakelyn.

Dr. **Wakelyn**. What I wanted to say is that in a standard study like this, whether NIOSH does it or not, they list A, B, C, D, or 1 through 15 or whatever. All the cross-sectional epidemiological studies that NIOSH has done, which are now entered into the OSHA record, were done that way. It is standard practice not to list the names of the companies. That is part of the way that one gets the cooperation of all the companies and is able to get authentic data.

Mr. **Gore**. Yes. I see. Now Dr. Wakelyn, do you see this—I mean, your analysis that produced this figure of under 5,000 people suffering from byssinosis takes the percentage figure and applies it to the total number exposed. Now that seems to assume that the people included in the study are representative of the industry. Do you believe that?

Dr. **Wakelyn**. Well, it is not necessarily an absolute figure, of course, but it is the same sort of thing that anybody has done when they have come up with numbers. You have to use some realistic base of numbers.

Do I believe this is representative of the industry? It certainly is as representative of the industry as Dr. Merchant's study, which he claimed was not representative of the industry. But I am sure this is more representative.

Mr. **Gore**. Well, Dr. Imbus testified earlier that he did not think it was representative of the industry.

Dr. **Wakelyn**. Yes; he said his was not necessarily representative. Dr. Merchant's study was not even representative of Burlington Industries. This study is probably more representative of the industry, although, as Dr. Imbus said earlier, the mills used probably would have a more sophisticated medical surveillance program.

Mr. **Gore**. Now wait a minute. We are talking about the same study, aren't we? Are you talking about the survey again?

Dr. **Wakelyn**. That is what I am saying, the same study.

Mr. **Gore**. Well, now, Dr. Imbus' study, the one that he did for ATMI, he said—of the 41,000 workers—he said it was not, he did not pretend that it was representative of the industry and he is not saying that that reflects the conditions in the industry generally.

Dr. **Wakelyn**. Yes; but he is also not saying that it does not. We do not really know the answer to that question.

Mr. **Gore**. No, he is—well, is Dr. Imbus still here? Could you say, do you believe that those people studied are representative of workers in the industry generally?

Dr. **Imbus**. Mr. Chairman, I have been outside of Burlington Industries a short period of time, about 9 months. I have had opportunity to look at the data from a number of other companies which would not have been suitable for this study because it did not have the dust level data along with it, such as Mr. Martin's firm and so forth. I see no great inconsistencies with what I have seen in these other companies to date, with the body of data that I presented to you.

Mr. **Gore**. Let me read you, let me tell you what this trade journal said about it, Textile World. Are you familiar with——

Dr. **Wakelyn**. That sounds like an authoritative refereed journal, sir.

Mr. **Gore**. Is that a journal that you see as having an opinionated perspective?

Dr. **Wakelyn**. It is certainly not something that you can take absolutely what it says.

Mr. **Gore**. Is it an industry trade journal?

Dr. **Wakelyn**. It is a trade journal. It is a trade journal. I mean, it is like a newspaper.

Mr. **Gore**. That is correct, and it follows the industry very carefully, more carefully than the general press. I mean, the fact is that when this came out there were many voices within the industry, not just outside observers but people within the industry, who said, "Look, this is really going to raise a lot of eyebrows because it is not a representative kind of study." I mean, weren't there voices within the industry saying that, that you were exposing yourself to criticism?

Dr. **Wakelyn**. Criticism can always be made. One has to make some decision on one's experience. Dr. Imbus has made some estimation on experience. These data were actually collected in the required way. Do you have a better number? Do you have a number that is based on any better information?

Mr. **Gore**. The number that OSHA has been using.

Dr. **Wakelyn**. Oh, OSHA does not use those numbers anymore. Those are archaic numbers, and there is no way that they can be substantiated. They were just for emotion and politics.

Mr. **Gore**. No, I disagree with that.

Dr. **Wakelyn**. Similar to what has been used in this meeting, and I hope you are going to be open-minded enough to review the information that has been put to you.

Mr. **Gore**. Well, I assure you that I intend to be open-minded and review all of the information but I also believe that the weight of the scientific evidence points in a direction other than what the industry survey and the Imbus study would indicate.

Mr. **Martin**. Mr. Chairman——

Mr. **Hoyman**. Mr. Chairman——

Mr. **Gore**. Yes?

Mr. **Martin**. I must respectfully disagree with that, and I am sorry, sir. I do not see that. Now you were talking about the figure.

Dr. Bouhuys, in his original study, used 646 textile workers, active and retired in Columbia, S.C., and extrapolated and expanded on that, and made the statement that there are 35,000, and to this day no one has ever proved that figure. We certainly have not.

Mr. GORE. Mr. Hoyman.

Mr. HOYMAN. Mr. Chairman, I would simply say that my impression of the medical testimony offered this morning showed a surprising amount of uniformity of conclusion, contrary to Mr. Martin's impression. It was my opinion, and you have the record, that the preponderance of the medical testimony this morning and the epidemiological studies that have been subjected to normal scientific testing, indicates that there is a clear dose-response relationship, that there is a substantial byssinosis problem, and the exception to those seems to be the ATMI product.

Dr. Imbus, I think, has been very candid in describing the unusual conditions under which that survey took place and the unusual source of that information. It is quite the opposite of the way in which other studies that have been published in scientific journals have been constructed. I think the record is very clear on this issue.

Mr. MARTIN. Well, then, let's get the record entirely clear. That study of Dr. Imbus was based on data required by the law and OSHA wrote the study protocol. The information that he got came as a result of the regulations, and I am saying that we did not change it. I would think, then, instead of saying it is an ATMI study, could we change it and say it is an OSHA study? Would that be all right?

Mr. GORE. Yes.

Mr. MARTIN. The tests were not performed by ATMI. Can we change it and say it is an OSHA study? We were required to test all these people, and the result of all these tests, this is where the information comes from, sir. It comes from an OSHA study.

Mr. GORE. From the effort to comply with the standards.

Mr. MARTIN. No, not an effort, but from complying with the law. Yes, sir.

Mr. GORE. From the way you complied with the OSHA standard.

Mr. MARTIN. Right. They said, "You check your employees." Now if you make the assumption that we did not do it honestly, that is up to you and the union and anybody else. However, let me say that this was absolutely mandated by OSHA to allow OSHA to check how effectively compliance would combat byssinosis.

Mr. GORE. For compliance purposes.

Mr. MARTIN. Sir?

Mr. GORE. I mean, it was mandated for compliance purposes. Let me say that the question of honesty does not have to be reached.

Mr. MARTIN. Well, I am sorry. Let me put it in a——

Mr. GORE. Let me conclude my statement, if I may. Statements can be perfectly honest and yet selective. Briefs filed by lawyers can be perfectly honest and yet not fully portray the total picture that is in dispute in a given lawsuit. Scientific studies can be designed in a way that elicits factual data yet portrays a picture that is not the full picture, and we all know that. It is not an absolutist kind of dispute.

However, if science is to be good science, then it has to be subjected to peer review, it has to be looked at by people who are not—who do not have an interest in a given outcome, lest they be tempted to design it in a way that does not give the full picture.

Mr. MARTIN. I agree, sir. I think you used the phrase this morning, "vested interest." However, by the same token, scientific evidence on both sides should be reviewed carefully, also. Is that not true, sir?

Mr. GORE. Yes, absolutely. Absolutely.

Mr. MARTIN. Thank you. I did not mean to say "dishonest." I know you do not think that we are dishonest.

Mr. GORE. I do not think that, nor do I believe, as you said about a hypothetical figure in your opening statement, that the industry is intentionally killing people.

Mr. MARTIN. No, that was an aside. It is not———

Mr. GORE. I know that.

Mr. MARTIN. No, but I can say quite honestly that we have been accused of that, quite honestly.

Mr. GORE. Yes.

Mr. MARTIN. In editorialized positions, we have been accused of killing. I think the phrase is, "Mill owners kill people."

Dr. WAKELYN. Mr. Chairman, I am very happy to hear you say that about adversarial science and I hope you believe it. You said the overwhelming preponderance of evidence, but actually the National Academy of Sciences study was talked about this morning. An esteemed man from Mt. Sinai, Dr. Kleineman, was picked as the chairman as well as an impartial committee. I know you tried to pick apart the committee but industry had nothing to do with picking those people. We asked NAS if they wanted some help and they did not. One of the reasons I was told Dr. Merchant was not picked for the NAS committee is because they picked nobody that was actually employed at the Government at the time of their review. They picked people that were supposedly independent experts in the field. You asked why Dr. Beck was not picked. Dr. Beck had not started doing any work in the area at the time of the study. He was not recognized in the area.

There are referenced in my statement at least four or five other independent reviews in textbooks, other books that are actually published, and that are not "in press," unpublished articles or articles in some review process, as are the WHO documents and others Dr. Merchant mentioned earlier. References in my statement, you can actually read, and see what some of these worldwide experts do think about these subjects.

Mr. GORE. Thank you very much.

Mr. Hoyman, did you want to comment on that?

Mr. HOYMAN. I would simply say this, that it is my recollection that that witness indicated, in spite of the content of that study and whatever reservations that study might show in terms of chronic byssinosis, that it was his opinion that the cotton dust standard should not be changed.

Mr. GORE. Yes, that was his conclusion during the questioning. We have kept you. I have some additional questions. If it is not an imposition, I would like to ask you to answer some short additional questions in writing. Is that OK?

Dr. **Wakelyn**. We would be happy to help you in any way.

[See Appendices D and E.]

Mr. **Gore**. That is fine, because we have kept you a long time and we have another vote on the floor.

I appreciate your patience and endurance during this proceeding. When you have scientific disputes, it makes for a difficult inquiry but I think that we have made some progress in this hearing, and I appreciate your willingness to let us have an independent reviewer look at the raw data on this matter.

I would like to thank all of our witnesses for their assistance here today, and with that, I would like to say also that we will have Mr. Auchter, who was unable to be here with us today, on a later occasion. Thank you all for being here today.

[Whereupon, at 5:15 p.m., the subcommittee recessed, to reconvene at the call of the Chair.]

APPENDIX A

DON FUQUA, FLA., CHAIRMAN

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U.S. HOUSE OF REPRESENTATIVES
SUITE 2321 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, D.C. 20515
(202) 225-6371

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MINORITY STAFF DIRECTOR

September 30, 1982

Honorable Thorne G. Auchter
Assistant Secretary for
Occupational Safety and Health
U. S. Department of Labor
Washington, D. C.

Dear Mr. Auchter:

I was disappointed that you were unable to appear before the Investigations and Oversight Subcommittee at our hearing last week on brown lung disease. The hearing addressed a number of controversial issues pertaining to byssinosis among workers in the cotton textile industry, and I had looked forward to discussing with you your agency's present review of the cotton dust standard. I hope that your illness has passed.

As you know, prior to the hearing, members of the Subcommittee staff had contact with your agency's staff with regard to several matters. I wish to call two of these matters to your attention. First, as you recall, I had requested in writing that members of the Subcommittee staff be allowed to meet individually with certain members of your cotton dust review team, namely Mr. David Smith, Dr. Susan Harwood, and Mr. Larry Braslow. Although the Subcommittee staff members were allowed to meet individually with Mr. Smith, Dr. Harwood, and Mr. Braslow, a member of your staff, Mr. Anthony Goldin, insisted on being present during each of the interviews, despite a specific written request from me that no OSHA employees, other than the team members, be present. I had made that request -- in fairness to both the agency and the employee -- to insure that the Subcommittee got the most candid assessment of the facts. I am disappointed that OSHA was not able to honor my request and will review the record of the hearing in this context.

Second, at my request, your agency provided the Subcommittee staff with copies of several documents pertaining to your review of the cotton dust standard. However, a number of these documents were undated. The Subcommittee staff requested that dates be supplied for these documents but was advised that it would be impossible to provide them prior to the hearing. I now make a formal request that the dates for these documents be provided.

As you were undoubtedly informed by the representatives of your agency who attended the Subcommittee hearing, a number of issues were raised at the hearing about which OSHA's comments would have been useful.

Honorable Thorne G. Auchter
September 29, 1982
Page 2

Consequently, at this time I wish to invite you to submit any additional written comments for the hearing record that you feel may be appropriate. Your original written statement is, of course, part of the record, but I welcome any additional comments on your behalf. Additional comments should be submitted within 10 days.

The Subcommittee is presently considering holding a second hearing on byssinosis, focusing specifically on OSHA's review of the cotton dust standard, since we were unable to cover that topic at last week's hearing. In making our determination, we will consider your prepared testimony as well as any additional comments you may submit. Should we hold a subsequent hearing your testimony would be required, and I am sure that we could arrange a mutually convenient date. The Subcommittee staff will be in touch with you should a hearing be scheduled.

Finally, the Subcommittee staff will submit to you under separate cover several questions relevant to last week's hearing and a further request for documents, where appropriate. The questions and your answers will be made part of the hearing record.

I appreciate your continued cooperation. Should you or your staff have any questions concerning this request, please contact Robert B. Nicholas, Chief Counsel/Staff Director at 226-3636, or Steve Owens, Counsel, at 226-3645.

Sincerely,

Albert Gore Jr.

Albert Gore, Jr.
Chairman
Subcommittee on
Investigations and Oversight

AG:Obe

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U.S. HOUSE OF REPRESENTATIVES
SUITE 2321 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, D.C. 20515
(202) 225-6371

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MINORITY STAFF DIRECTOR

October 8, 1982

Honorable Thorne G. Auchter
Assistant Secretary for Occupational
  Safety and Health
U. S. Department of Labor
Washington, D.C. 20210

Dear Mr. Auchter:

As I stated in my letter to you dated September 30, 1982, the Subcommittee on Investigations and Oversight has certain additional questions, answers to which we believe are important to complete the record for the Subcommittee's review of cotton dust. Enclosed you will find a list of these questions. Please answer the questions in writing and submit your answers to the Subcommittee staff within 10 days.

I appreciate your continued cooperation. If you have any questions, please contact Mr. Robert Nicholas, Chief Counsel/Staff Director, or Mr. Steve Owens, Counsel, at 226-3636.

Sincerely,

Albert Gore, Jr.

Albert Gore, Jr.
Chairman
Subcommittee on
  Investigations and Oversight

AG:Oms

Questions for Mr. Auchter

1. Please provide the dates and substance of all meetings during the calendar years 1981 and 1982 concerning the cotton dust standard between OSHA and:

   (a) the Office of Management and Budget
   (b) the U.S. Department of Labor
   (c) the Reagan Task Force on Regulatory Relief
   (d) the American Textile Manufacturers Institute
   (e) the U.S. Chamber of Commerce

2. Please provide copies of any summaries prepared by OSHA of the meetings discussed in Question #1, as well as any memoranda pertaining to those meetings.

3. Please provide copies of all correspondence and communications relevant to the cotton dust standard during the calendar years 1981 and 1982 between OSHA and the groups, agencies, and departments discussed in Question #1, as well as any memoranda pertaining to such correspondence and communications.

4. Please provide a copy of your daily calendar and that of Mr. Marc Cowan for the calendar years 1981 and 1982.

5. Please provide a list of OSHA's current priorities for issuing or reviewing health standards together with an explanation for each as to why the standard was placed on the list. What criteria did OSHA utilize in deciding which regulations to review, which substances to regulate, and which substances not to regulate?

6. Please provide OSHA's work plans, timetable, and target dates for the regulation of:

   (a) asbestos
   (b) ethylene oxide
   (c) chromium
   (d) anesthetic gases
   (e) access to employee exposure and medical records

7. What progress has OSHA made toward the regulations discussed in Question #6?

8. With regard to asbestos:

   (a) What is OSHA's risk assessment estimate of lifetime cancer risks at the current standard?
   (b) Please provide a copy of the risk assessment.
   (c) Does OSHA intend to issue an emergency temporary standard?
   (d) How many OSHA staff members are now working on the asbestos standard?
   (e) Please identify the individuals enumerated in (d).

9. With regard to anesthetic gases:

   (a) What is OSHA's risk assessment estimate of the risk from exposure to nitrous oxide?
   (b) Please provide a copy of the risk assessment.
   (c) Does OSHA intend to issue an emergency temporary standard?
   (d) How many OSHA staff members are now working on an anesthetic gases standard?
   (e) Please identify the individuals enumerated in (d).

10. With regard to employee exposure and medical records:

   (a) What rationale exists for shortening the length of time for which exposure records must be kept?
   (b) What rationale exists for narrowing the list of toxic substances for which exposure records must be kept?
   (c) A review of the toxic substances covered under the proposed regulation reveals that 25% of all OSHA-regulated substances will not be covered. Could you explain this inconsistency?
   (d) How many OSHA staff members are now working on these regulations?
   (e) Please identify the individuals enumerated in (d).

11. With regard to chromium:

   (a) What is OSHA's risk assessment estimate of the risk from exposure to hexavalent chromium?
   (b) Please provide a copy of the risk assessment.
   (c) Does OSHA intend to issue an emergency temporary standard?
   (d) How many OSHA staff members are now working on a chromium standard?
   (e) Please identify the individuals enumerated in (d).

12. How does OSHA define "grave danger" for purposes of issuing an emergency temporary standard? How does this definition apply to OSHA's actions on formaldehyde, asbestos, ethylene oxide, chromium and anesthetic gases?

13. Earlier this year, OSHA announced plans to eliminate 372 enforcement positions. Total workplace inspections by OSHA have already declined by 27% from 1980 levels, and complaint inspections have declined by 57%. Total serious citations issued have declined by 52%, and willful citations issued have declined by 89%. Given the already decreasing number of inspections and citations and the intended reduction in enforcement personnel, how can OSHA ensure workplace safety?

   (a) What evidence does OSHA have that workplace safety is not already imperiled?
   (b) Please explain OSHA's criteria for deciding which plants to inspect generally and for selecting the employee complaints to which OSHA will respond with an inspection.

U.S. Department of Labor

Assistant Secretary for
Occupational Safety and Health
Washington, D.C. 20210

29 NOV 1982

Honorable Albert Gore, Jr.
Chairman
Subcommittee on Investigations
and Oversight
Committee on Science and Technology
House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

This is in further response to your letter of October 8, 1982, in which you requested that the Occupational Safety and Health Administration (OSHA) answer a number of questions about the agency's activities. As I indicated in my letter of November 15, 1982, OSHA would require additional time to provide responses to questions 1-3, which concern meetings and correspondence related to the agency's actions on cotton dust. We have completed our search of various sources within the agency where this information may be found; our responses to these questions are enclosed.

I hope this information is useful to you as the Subcommittee completes its review of the cotton dust issue. If I can be of further assistance, please feel free to contact me.

Sincerely,

Thorne G. Auchter
Assistant Secretary

Enclosures

Question 1: Please provide the dates and substance of all meetings during the calendar years 1981 and 1982 concerning the cotton dust standard between OSHA and:

(a) the Office of Management and Budget
(b) the U.S. Department of Labor
(c) the Reagan Task Force on Regulatory Relief
(d) the American Textile Manufacturers Institute
(e) the U.S. Chamber of Commerce

Response 1(a): OSHA has no records of meetings between agency officials and officials of the Office of Management and Budget at which the cotton dust issue was the subject of the agenda.

Response 1(b) On February 3, 1982, OSHA's Deputy Assistant Secretary, Mark D. Cowan, met with Under Secretary of Labor, Malcom R. Lovell, Jr., to discuss the agency's options for an advance notice of proposed rulemaking on cotton dust.

Numerous internal meetings among OSHA staff and meetings between OSHA and the Office of the Associate Solicitor of Labor for Occupational Safety and Health have been conducted at which the cotton dust issue was discussed. These internal Departmental meetings are not enumerated here.

Response 1(c): OSHA has no records of meetings between OSHA and officials of the President's Task Force on Regulatory Relief at which the cotton dust issue was the subject of the agenda.

Response 1(d): A review of OSHA records indicates that the following meetings were held between OSHA officials and officials of the American Textile Manufacturers Institute (ATMI) during calendar years 1981 and 1982. Unless otherwise noted, the meetings were general in nature, including discussions of the status of OSHA's work on the cotton dust standard.

February 26, 1981. OSHA participants: Mr. John Martonik and Dr. Robert Beliles.

May 22, 1981. OSHA participants: Mr. John Martonik and Mr. Gail Brinkerhoff.

June 10, 1981. OSHA Barticipant: Mr. John Martonik.

July 9, 1981. OSHA participant: Mr. John Martonik.

June 15-16, 1981. Site visits at a number of cotton mill locations, organized by ATMI. OSHA participants: Dr. Patricia Sparks, Mr. Raymond Donnelly, Dr. Long Loo, Mr. Larry Braslow, Dr. Susan Harwood. (See the site visit agenda, attachment to question 2.)

Response 1(d) Continued:

September 9, 1981. OSHA participant: Mr. John Martonik.

October 1, 1981. OSHA participant: Mr. John Martonik.

November 17, 1981. OSHA participant: Mr. John Martonik.

January 8, 1982. OSHA participants: Assistant Secretary Auchter, Deputy Assistant Secretary Cowan.

January 15, 1982. OSHA participant: Mr. John Martonik.

February 12, 1982. OSHA participants: Mr. John Martonik, Dr. Robert Beliles, Mr. David Smith.

February 18, 1982. OSHA participant: Dr. Susan Harwood. (See meeting log, attachment to question 2.)

March 12, 1982. OSHA participants: Dr. Susan Harwood, Mr. Larry Braslow, Dr. Long Loo, Mr. Raymond Donnelly, Mr. Charles Gordon, Dr. Patricia Sparks, Dr. Kenneth Cram, Dr. Robert Beliles. ATMI met with members of the OSHA team reviewing the cotton dust standard to discuss a number of issues of concern to ATMI. (See the agenda prepared by ATMI, attachment to question 2.)

April 8, 1982. OSHA participants: Dr. Mary Ellen Weber and Mr. Larry Braslow. OSHA staff reviewed a number of employers' plans for achieving compliance with the OSHA cotton dust standard. The purpose of this review was to help the agency assess compliance costs and the technological feasibility of the cotton dust standard.

May 13, 1982. OSHA participant: Mr. John Martonik.

July 6, 1982. OSHA participant: Mr. John Martonik.

September 3, 1982. OSHA participants: Mr. John Martonik and Mr. Larry Braslow. (See meeting log, attachment to question 2.)

October 7, 1982. OSHA participant: Mr. John Martonik.

Response 1(e)

OSHA has no records of meetings between agency officials and officials of the U.S. Chamber of Commerce at which the cotton dust issue was a subject of the agenda.

Question 2:	Please provide copies of any summaries prepared by OSHA of the meetings discussed in question #1, as well as any memoranda pertaining to those meetings.
Response 2:	All existing summaries concerning meetings discussed in question 1 are attached. OSHA is unaware of any memoranda pertaining to those meetings.

AIRPORT 6/15/81

Site-Visit Agenda -- Prepared by ATMI

John Tritsch - ATMI
Diane Baulovsky - ATMI

CONE MILLS - Greensboro, N.C.

Marcus Bradsher - plant manager
Jim King - director of mill services
Dewey Trogden - Chairman of the Board
Charles Martin - Corporate Medical Director
Frank Fary - Corporate public relations
Dave Moff - personnel
Norman Pinkleton - office manager
Ralph Tharp - supervisor of dying and finishing
James Payne - supervisor of yarn manufacturing

Sparks, Donnelly, Loo
Braslow, Harwood

BURLINGTON - Mooresville, N.C.

John Duncan - plant manager
Ed Murray - Group manager for denim
Bob Craig - technologist

Sparks, Donnelly, Loo
Braslow, Harwood

TiCaro - Gastonia, N.C.

Jim Martin - President and Chairman of the Board
Jim Fry - Special Assistant to Mr. Martin
Art Warren - Vice President of the Arlington Division
Albert Myers - President of Primary Yarn Manufacturing
Jimmy Rawlings - Assistant Vice President in charge of cotton
Mike Smith - Safety and Health Director

Sparks, Donnelly,
Loo, Harwood

Hamrick - Gaffney, S.C.

John Hamrick
John Reeves - Vice President
Don O'Shields - personnel
Wylie Hamrick - President
Mrs. Baker - nurse
Lyman Hamrick - assistant plant manager
Harvey Campbell

Sparks, Donnely, Loo, Harwood

Springs Mills Fort Mill , S.C. [illegible]

Donnelly, Sparks, Loo,
Harwood

Francis Bell - Vice President
Ed Underwood - Corporate Medical Director
Cog Gregory - Group Manager, Consumer Products Division
Jim Wells - Corporate Manager, Safety and Health
Jim Barrett - plant manager White plant
Steve Hudson - assistantplant manager

ATMI summary meeting Fort Mill, S.C. [illegible]

Donnelly, Sparks, Loo,
Harwood

Jack Vincent Dover Textiles AtMI director of SAfety and Health Committee
Harold Imbus - Burlington corp med dir
Francis Bell - Springs VP
Haven Newton - Fieldcrest personnel
Jim Griffin Hanes engineering
Charles Martin Cone corp med dir
Horace Ledford Dover [illegible]
Jim Wells Springs [illegible]
Bob Robards JP Stevens corp med dir
Ed Underwood Springs corp med dir
Jim Bostick-Riegel govt relations

Textile Industrial Hygiene Roundtable Spartanburg, S.C. [illegible]

Beliles, Harwood

Doug McKay - WestPoint Pepperell
Barbara Peat-Chicopee
Ellis Pardue - Hanes Group, Inc.
E.B. Katzenmeyer B.F. Goodrich
Dennis Smoot - JP Stevens
Ann L. Walker - Hanes Group Inc.
Miller Jones Burlington Ind.
Raymond Childress - M. Lowenstein Corp
Andrew Schauder - United Merchants and Mfg.
P.J. Wakelyn National Cotton Council
Preston Sasser - Cotton Inc.
Bob Jacobs-Cotton Inc
John Neefus- Burlington Inc

Paul Gundlach Cannon Mills
Lee Ivester - Field crest
Chris Phillips

TELEPHONE - [✓ MEETING LOG]

SUBJECT Cotton Dust

PREPARED BY Harwood DATE 2/18 or 2/19/82

MEETING HSP-OSHA INCOMING CALLS

OUTGOING CALLS

PERSON(S)	ORGANIZATIONS(S)	TELE. NO
John Tritsch	ATMI	
Phil Wakelyn	N. Cotton Council	
Susan Harwood	OSHA	

OBJECTIVE:

SUMMARY:

Discussed ANPR published earlier (2/9/82).

FOLLOW-UP PROCEDURES

SPECIAL NOTES:

TELEPHONE - MEETING LOG

SUBJECT Cotton Dust

PREPARED BY Harwood DATE 3/12/82

MEETING HS-3215B INCOMING CALLS

OUTGOING CALLS

PERSON(S) ORGANIZATIONS(S) TELE. NO

Susan Harwood - Health Standards
Larry Braslow - Regulatory Analysis
Long Loo - Technical Support
Ray Donnelly- Policy
Chuck Gordon- Solicitor
Patricia Sparks - Occupational Medicine
Ken Cram - Health Standards
Bob Beliles - Health Standards

John Tritsch -ATMI
John Neefus- Burlington
Doug McKay - WestPoint Pepperell
Ann Walker - Hanes
Lee Ivester- Fieldcrest
Dennis Smoot - J.P.Stevens

John Birdsong
Marilyn Schulte } Centaur
Paul Kolpa

OBJECTIVE:

SUMMARY:

FOLLOW-UP PROCEDURES

SPECIAL NOTES:

TOPICS FOR DISCUSSION WITH OSHA PROJECT TEAM

General

1. Goal - a more performance oriented standard.
    - A. How to measure? - incidence of byssinosis?
    - B. Turn PEL's into warning signals rather than absolute limits.
    - C. Terminate requirement of formal compliance plans.
    - D. Terminate formal ventilation measurements.
2. Terminate application to non-risky operations.
    - A. Knitting
    - B. Weaving perhaps
3. Exclude users of small amounts of cotton
    - A. Less than 10%?
4. Phase-in plan for new plants or others beginning to use cotton.
5. Eliminate wage-guarantee/transfer requirement.
    - A. Matter for collective bargaining.
6. Limit record keeping as necessary.
    - A. Eliminate duplications.

Cotton Dust Measurement

1. Cotton dust definition - is there a basic unit?
2. Corrections for non-cotton contaminants.
3. Recognition of inherent sampling equipment errors.
4. Facilitate acceptance of new and better dust measurement devices.

Action Levels

1. Establish action levels for each PEL below which requirements would be nominal.
    - A. Multiple tiered for full standard application, respirator wearing and engineering compliance.
    - B. Eased sampling, training and medical surveillance requirements below lowest action level.
    - C. Recognize reality of an occasional excursion above lower action levels without jeopardy to eased requirements.

Respirators

1. Limit respirator wearing requirements
    - A. Individuals known to be sensitized
    - B. Those exposed during blowdowns and removal of chokes

    - D. Dust levels above PEL
    - E. Allow partial shift wearing based on dust levels

Training

1. Major training effort should be given to new employees and those transferred to new operations.
2. Training refreshers should be given only to those experienced employees exposed to higher dust levels (above PEL's) or otherwise required to wear respirators.

TELEPHONE - MEETING LOG

SUBJECT Cotton Dust

PREPARED BY Braslow DATE 9/3/82

MEETING INCOMING CALLS

OUTGOING CALLS

PERSON(S) ORGANIZATIONS(S) TELE. NO

John Martonik - Health Standards
Larry Braslow - Regulatory Analysis
John Tritsch - ATMI
Representatives of several textile firms

OBJECTIVE:

SUMMARY:

Discussed technical feasibility problems of the 200 ug/m^3 PEL

FOLLOW-UP PROCEDURES

SPECIAL NOTES:

Question 3: Please provide copies of all correspondence and communications relevant to the cotton dust standard during the calendar years 1981 and 1982 between OSHA and the groups, agencies and departments listed in question #1, as well as any memoranda pertaining to such correspondence and communications.

Response 3: The documents you have requested are attached.

AUG 26 1981

17492 ✓

Robert E. Coleman, President
American Textile Manufacturers
Institute, Inc.
1101 Connecticut Avenue, N.W.
Suite 300
Washington, D. C. 20036

Dear Mr. Coleman:

This is in response to your recent letter concerning further Occupational Safety and Health Administration (OSHA) actions related to the Cotton Dust Standard. We have construed the Supreme Court's recent decision to rule out the Agency's use of cost-benefit analysis in setting standards regulating toxic substances. We intend, of course, to comply with the Supreme Court's rulings.

Members of my staff are continuing to work on the question of whether the Cotton Dust Standard is applicable or should be enforced in areas where the assessment of risk, at least as a threshold finding, has not been made. Furthermore, in the course of gathering information with regard to OSHA's March 31 Advance Notice of Proposed Rulemaking, the staff has obtained much useful material concerning the technical and scientific difficulties being experienced in the primary textile segment of the industry covered by the standard. Through multi-disciplinary collaboration, the staff continues to review and consider state-of-the-art technological innovations, scientific information, and medical opinions that might render portions of the standard faulty or inapplicable.

I hope that the members of your staff will continue their helpful contacts with OSHA. We would appreciate any further information from you or your staff that will aid us in our determinations.

Sincerely,

John Martonik
Deputy Director
Health Standards Programs

ATMI
AMERICAN TEXTILE MANUFACTURERS INSTITUTE, INC.
1101 CONNECTICUT AVENUE, N.W., SUITE 300, WASHINGTON, D.C. 20036
TWX: 710-822-9489
TEL: 202/862-0500

June 18, 1981

The Honorable Thorne G. Auchter
Assistant Secretary of Labor
for Occupational Safety and Health
U. S. Department of Labor
200 Constitution Avenue, N. W.
Room S-2315
Washington, D. C. 20010

OSHA CCU #
17992

Dear Secretary Auchter:

In the wake of the Supreme Court's recent decision in American Textile Manufacturers Institute, Inc. v. Donovan, No. 79-1429, I am writing to advise you of the view of the American Textile Manufacturers Institute, Inc. ("ATMI") regarding the course of action we believe OSHA should pursue in connection with the supplemental rulemaking proceeding it has planned to conduct to reconsider the Cotton Dust Standard. While ATMI was disappointed in the Supreme Court's ruling, we do not believe it should deter OSHA from proceeding to reconsider the Cotton Dust Standard and, hopefully, to revise it in various respects.

We recognize the Supreme Court decision creates uncertainty as to whether OSHA may, if it chooses, revise the Cotton Dust Standard to reflect the results of a cost-benefit analysis. We also understand that, in the first instance, the Administration will have to answer that question for itself and possibly decide whether to conduct such an analysis for other reasons.

But even if you decide not to conduct a cost-benefit analysis for the Cotton Dust Standard, we would urge you to follow through on your proposal to reconsider the Standard, which we believe should be revised in a number of respects. ATMI has long contended that the present Standard imposes a variety of undue burdens on employers without providing any additional health protection for workers in our industry. We believe reconsideration of the Standard will demonstrate that it can be made far more cost-effective without threatening the health of our employees. In this regard, we would call your attention to the fact that the Supreme Court's decision in the Cotton Dust case appears to give express approval to the use of cost-effectiveness techniques in the formulation of occupational health standards. See slip op. at 21-22 n.32.

In Comments filed on May 15, 1981, in response to your Advance Notice of Proposed Rulemaking on Occupational Exposure to Cotton Dust, ATMI identified a host of issues we believe should be reconsidered by OSHA in a supplemental rulemaking proceeding. Those issues cover a wide range of provisions in the current Standard that can and, in our view, should be deleted or revised in one respect or another. In almost all cases, the issues we have identified could be addressed even if cost-benefit considerations are put entirely to one side.

We believe now, as we did when we filed our Comments on May 15, that these issues are appropriate matters for reconsideration. Accordingly, we urge you to proceed with a supplemental rulemaking on those issues, whether or not a cost-benefit analysis is performed. ATMI is prepared to participate fully in such a proceeding and to assist you in whatever way we can to develop a more rational Standard which protects the health of textile workers without unnecessarily burdening their employers.

Sincerely,

Robert E. Coleman

Robert E. Coleman
President

REC/jd

FEB 17 1982

Mr. C. Boyden Gray
Legal Counsel
Office of the Vice President
Executive Office Building
Washington, D. C. 20501

Dear Boyden:

Please accept my apology for the delay in responding to your referral of a letter from Congressman Hal Daub. In his letter, Congressman Daub expressed his concern about the Cotton Dust Standard as it applies to the waste cotton industry, specifically the bedding industry.

I have enclosed a copy of our December 4, 1981, response to the Congressman's letter. Since the date of this letter, we have published an Advance Notice of Proposed Rulemaking for Cotton Dust (47 FR 5906). The notice announces, among other things, that OSHA intends to reconsider the evidence of the risk of adverse health effects in workers exposed to cotton dust in the waste cotton industry. This will be followed by OSHA's filing of a motion in the District of Columbia Court of Appeals requesting a remand of the record as it applies to waste cotton industry. If the Court agrees to our request, we intend to move quickly to reconsider the evidence in order to finally resolve this issue.

We will continue to keep you informed of our progress in this matter.

Sincerely,

MARK D. COWAN

Mark D. Cowan
Deputy Assistant Secretary

Enclosure

OH:SHarwood:st: 2/10/82
Room N3716 x 37148

cc: OH File, MCowan, SHarwood, WPC File#82- 136, Document#2139T

OFFICE OF THE VICE PRESIDENT
WASHINGTON

October 19, 1981

Mr. Mark Cowan
Deputy Assistant Secretary
Occupational Safety & Health Administration
200 Constitution Avenue, N.W., Room S-2315
Washington, D.C. 20210

Dear Mark:

Enclosed is a copy of Representative Daub's letter on the bedding manufacturers.

The letter appears to be accurate except that it does not point out that as a result of the problem, bedding manufacturers are beginning to use urethane foams instead of cotton. This solves the OSHA difficulties but increases costs considerably.

The average bedding company employs 28 people, only 10 percent of whom ever come into physical contact with the cotton, which itself is already processed so that apparently there is no detectable exposure to cotton dust.

Good to see you last week.

Sincerely,

Boyden

C. Boyden Gray
Counsel to the Vice President

OSHA CORRESPONDENCE CONTROL FORM

DATE: 81 04 07

CONTROL NO: 16626

LEGISLATOR:

OTHER CONTROL NO:

CONST TUENT: M de Bernardo

DUE DATE: CFR

AFFILIATION: Chamber of Commerce

ASSIGNED TO: ICA

DATE OF LETTER: 81 04 02

SIGNATURE LEVEL:

SUBJECT: Cotton Dust Std

DATE ACKNOWLEDGED:

SPECIAL INSTRUCTIONS:

STATUS: s 81 04 07

OBTAIN INPUT FROM OR CONCURRENCE OF:

SEND COPIES OF THE INCOMING CORRESPONDENCE TO: Roberts

SEND COPIES OF THE RESPONSE TO:

(s-Secretary, U/S-Under Secretary, a-Assistant Secretary,
d-Deputy Assistant Secretary, p/d-Program Director, ap-Appropriate)

ASSIGNEE ROUTING

Assigned to:	1.	2.	3.
Date Assigned:	1.	2.	3.
Due Date:	1.	2.	3.

CONTACT CCU-S2322 FRANCES PERKINS BUILDING, (202) 523-9876,77,78

KEEP THIS CONTROL RECORD WITH CORRESPONDENCE AT ALL TIMES

4/3/81

Thorne Auchter –

F.Y.I.

– Mark deB.

Mark A. de Bernardo
Labor Law Attorney
Human and Community Resources Division
(202) 659-6101

Chamber of Commerce of the United States
1615 H Street, N.W.
Washington, D.C. 20062

Chamber of Commerce of the United States
HUMAN AND COMMUNITY RESOURCES DIVISION
LABOR LAW SECTION
202-659-6104
1615 H STREET, N.W.
WASHINGTON, D.C. 20062

April 2, 1981

Editor-in-Chief
The Washington Post
1150 - 15th Street, N.W.
Washington, D.C. 20071

OSHA CCU #
16626

To the Editor:

In reply to your editorial headlined "Cotton Dust" (April 2), I feel it important to clarify a few points regarding recent actions by the Occupational Safety and Health Administration regarding the cotton dust standard and the cost-benefit issue in general.

You correctly refer to the very compelling "need for reducing worker exposure to cotton dust," and the necessity of recognizing "the best way to do it." On these points you will find no argument here. But isn't this effort — indeed, this responsibility — to find the "best way" to regulate cotton dust exposure, primordial to the recent OSHA action? Isn't finding the "best way" to regulate in the interests of all affected parties?

The Post's and other recent criticisms of the agency action seem to ignore one decisive point — that while the present administration seeks to review the government position to assure that it is, in fact, the government position, the cotton dust standard remains in effect and will continue to be enforced. Worker protection has not been compromised, nor is there any indication that it will be.

What there is conclusive indicia of is the strong commitment of the agency to embrace a uniform approach to the cost-benefit issue and to avoid protracted and contradictory litigation in order to ensure judicial expediency and regulatory consistency.

The Post calls OSHA's Supreme Court request for a remand of its cotton dust standard "a curious choice for a test case," which "will introduce undesirable uncertainty."

First, "curious" is an altogether inappropriate adjective — "obvious" would be better. Common sense requires that OSHA speak first on the cost-benefit issue before judicial evaluation is apposite.

Second, "test case" is again an inconsonant choice of words — nothing is being tested. While the standard continues to be enforced, OSHA seeks the opportunity to reevaluate the standard on a cost-benefit basis to avoid an on-again-off-again courtroom charade and establish an unfluctuating regulatory policy. Not to reevaluate the cotton dust standard might well have been irresponsible since it would only delay — at the considerable expense and confusion of all concerned parties — the implementation of what, based on recent

White House and Labor Department actions, appears to be a dramatically different regulatory approach. It makes no sense to have the government litigate what is not the government's position, or to force OSHA to do now what it would only have to undo later.

Third, as to the "undesirable uncertainty" reevaluation "introduces," this simply isn't so. All parts of the standard are not being reopened, and to leave the cost-benefit issue unresolved invokes the ultimate "uncertainty" into these very compelling occupational health issues.

Why is it necessary for OSHA to take any action at all? Whether assessing blame or dispensing recognition, the Post need not look to Thorne Auchter and OSHA, but rather to Ronald Reagan and the White House. Executive Order 12291, issued February 17, 1981 mandates that regulators reevaluate their rule-makings in light of current regulatory priorities. It is imperative that the federal government adopt one — and only one — approach to cost-benefit and therefore it is fully appropriate and necessary that OSHA comply with this Presidential directive.

The Post editorial speaks of cost-benefit analysis as being advocated by those favoring an "easy way out." It is not. It is necessary and wholly worthwhile, and is far from "easy." Cost-benefit provides a means of setting priorities, and of applying limited resources where they are most needed and most effective. Cost-benefit as an essential regulatory technique is also fully consistent with the OSH Act's "reasonably necessary and appropriate" and "to the extent feasible" standard-setting language; with the Supreme Court's momentous July, 1980 decision striking down the benzene standard because of a lack of benefit exposition; and with the executive orders of not only this administration, but past ones as well.

It is not, as the Post editorial suggests, a question of making Congress ensure that "industries do not pass off the real costs of doing business." Rather, it is a question of ensuring that the administration "not pass off" its responsibility to promulgate effective and equitable standards based on a sound — and consistent — cost-benefit approach.

Mark A. de Bernardo

Mark A. de Bernardo
Labor Law Attorney
U.S. Chamber of Commerce

OCCUPATIONAL
SAFETY AND
HEALTH
APR 1 2 10 PM '81
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THE WASHINGTON POST APRIL 2, 1981

Cotton Dust

THE NEW head of the Occupational Safety and Health Administration, Thorne G. Auchter, has selected the cotton-dust control standard as the first case for application of the administration's "cost-benefit" approach to federal regulation. He has asked the Supreme Court to delay its review of the Court of Appeals decision upholding the standard against industry attacks in order to allow his agency to reexamine the issue.

In some ways the cotton-dust issue is a curious choice for a test case. The need for reducing worker exposure to cotton dust—the source of byssinosis or brown-lung disease—has been debated, analyzed and litigated for over 10 years, as has the best way of doing it. This was hardly a rush to regulate. The 1978 standard is also a sensible and substantial retrenchment from the one originally proposed. Moreover, dramatic progress toward compliance has already been made, particularly in that segment of the textile industry that, after a massive modernization effort over the last four years, has now moved into a strong, internationally competitive position. The $25 billion in additional investment projected for the rest of the decade will, as a byproduct, bring much more of the industry into conformity with the control standards.

Reopening all parts of the standard will introduce undesirable uncertainty into the continuing modernization effort and, perhaps, confer an unfair competitive advantage on those firms that have not yet put in the required controls. It may, however, prove instructive to those advocates of cost-benefit analysis who see the technique as an easy way out of the difficult and inherently political questions involved in health and safety regulation.

Compared with many other industrial hazards in which the risks of exposure are uncertain and potentially related diseases are slow to develop, cotton-dust control benefits are relatively clear. Byssinosis has been reliably linked to cotton-dust inhalation; the disease develops quickly among those susceptible to it; the disability is progressive if exposure continues; and the costs of medical treatment, litigation of compensation cases and disability payments are substantial. Requiring workers to wear sufficiently protective face masks —instead of installing ventilation systems as the standard requires—is considered a feasible alternative only by people who haven't tried either wearing such a device for eight hours or supervising people who do.

All of this is laid out in the lengthy cost-benefit analysis of the cotton-dust standard done in 1979 at the direction of Congress. Further refinement of the study might suggest reconsideration of some parts of the standard. But no magic is to be expected. Analysis of this sort is a woefully imprecise art. (To call it a science is to invite gales of laughter from the economics profession that practices it.) Any honest analysis will show large and sometimes huge ranges in the estimates of even the most tangible sorts of costs and benefits. Even if these uncertainties could be resolved, we would still not know what value to place on reducing pain or avoiding premature death—a matter that is essentially one of both policy and politics.

Comparing *relative* costs and benefits is, no doubt, a useful device for deciding among alternative regulations. But in the cotton-dust case and all the many others like it, no computation, simple or complex, can absolve Congress of its responsibility for seeing that industries do not pass off the real costs of doing business on either their workers, their communities or the general taxpayer.

U.S. Department of Labor

Occupational Safety and Health Administration
Washington, D.C. 20210

Reply to the Attention of:

04 DEC 1981

Honorable Hal Daub
House of Representatives
Washington, D.C. 20515

Dear Congressman Daub:

During a recent conversation with Boyden Gray, he provided me with information on the results of a survey that you conducted of small businesses in your district with regard to the problem that members of the National Association of Bedding Manufacturers have with the 1978 Cotton Dust Standard.

As you know, the National Association of Bedding Manufacturers, together with industry groups in the textile and cotton waste utilization sectors, sought judicial review of the 1978 standard for employee exposure to cotton dust. Their cases were consolidated in the United States Court of Appeals for the District of Columbia Circuit. Before the standard was to go into effect in September 1978, the waste recyclers and manufacturers and users of cotton batting petitioned the Occupational Safety and Health Administration (OSHA) for reconsideration on the basis of the appearance of a new health study. The Agency granted this request but, after a period of review, reinstated the standard for the cotton waste industry including the bedding manufacturers. In the interim, the Court of Appeals had stayed the standard and severed the cases in this industry from the main litigation which ended with the Supreme Court decision in June of this year. The waste industries' case was delayed by the Court of Appeals until the resolution of the Benzene and Cotton Dust cases in the Supreme Court. In the Benzene case, the court imposed a requirement that OSHA demonstrate a significant health risk prior to regulation. In Cotton Dust, the court rejected a requirement that health standards meet a cost benefit test. In the meantime, the judicial stay has continued, and the standard has not yet gone into effect for these industries.

After the conclusion of the Supreme Court litigation, OSHA took up the matter of the standard's application to the various non-textile industries, including the bedding industry. After careful consideration, OSHA has decided that it is appropriate to reconsider the application of the standard to the cotton waste processing and utilization industry in light of the requirement that OSHA demonstrate a significant health hazard.

We are currently preparing the appropriate Federal Register notice and the court papers in order to obtain a remand of the record from the Court of Appeals. If the standard is remanded for reconsideration, OSHA will consider, through public proceedings, all available evidence of adverse health effects in this industry.

The matter of the enforceability of the "old" Cotton Dust Standard, 29 CFR 1910.1000, has been brought to our attention; in litigation before the Occupational Safety and Health Review Commission, OSHA has taken the position that the "old" Cotton Dust Standard is enforceable until the new standard becomes effective. The matter is currently awaiting decision by the Commission.

We hope that we have answered your questions concerning OSHA's Cotton Dust Standard.

Sincerely,

Mark D. Cowan
Deputy Assistant Secretary

OH:S.Harwood:HIN:11-18-81
Room N3718 X37148

cc: OSHA Official File
M.Cowan
J.Martonik
R.Beliles
S.Harwood
R.Swain
J.Bryson
Chron file ✓

MARK D. COWAN
DEPUTY ASSISTANT SECRETARY OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

Date:

To: [illegible]

Subj:

ACTION:

URGENT

Please call me re: ______

Please see me re: ______

Please address: ______

Please prepare: [illegible]

INFORMATION:

FYI & return ___

FYI & retain ___

FYI & discard ___

FILE: ______

APPROVED ___

DISAPPROVED because ______

COMMENTS:

SMALL BUSINESS COMMITTEE
COMMITTEE ON
GOVERNMENT OPERATIONS
SELECT COMMITTEE ON AGING

Congress of the United States
House of Representatives
Washington, D.C. 20515

October 9, 1981

Mr. C. Boyden Gray
Legal Counsel
Office of the Vice President
Executive Office Building
Washington, D. C. 20501

Dear Mr. Gray:

As you are aware, I have been actively involved in seeking out examples of unproductive federal regulations. Earlier this year, I asked 11,000 small businesses in my district to offer their own experiences with regulatory problems so that I could make them available to the Vice President's Task Force.

In the process, I became acquainted with the National Association of Bedding Manufacturers, the president of which is a constituent of mine, Mr. Irving Veitzer of Omaha.

The members of the National Association of Bedding Manufacturers are subject to a variety of federal government regulations, but one of the most vexatious is the coverage of the industry under the Occupational Safety and Health Administration's cotton dust standard. The bedding assembly industry was indiscriminately included in the cotton dust regulation in the first place and is now potentially subject to a confusing set of regulatory demands which are completely out of proportion to any benefit the standard might offer. The fact that the bedding assembly industry is composed predominantly of small businesses makes it more than usually vulnerable to injury from unnecessary regulation by the federal government, and the cotton dust regulation is a prime example.

For a number of years, the Federal Government has examined the consequences of the exposure of workers in the cotton textile industry to cotton dust from the point of view of byssinosis, or "brown-lung" disease. At no time during this process has the Government had before it any evidence that there was a significant risk to the health of workers in the bedding assembly industry (as opposed to the cotton textile industry). To this day, the exact causes of byssinosis remain unknown, and no one can identify the substance in "cotton dust" which is responsible for this disease. What is known, however, is that the content of cotton dust differs dramatically between cotton textile mills, where the dust is composed mostly of cotton particles, and bedding assembly plants, where the cotton fibers have been extensively processed before they are handled in the form of prefabricated batting and where the dust is likely to be composed primarily of substances other than cotton. Moreover, while there is some scientific evidence of a health hazard in textile mills, there is no such evidence of a health hazard in the bedding assembly industry.

In light of this, it was unjustifiable for the Occupational Safety and Health Administration (OSHA) simply to assume that all industries which use cotton in any form - - whether or not a health hazard had been demonstrated or even identified - - should be subject to the cotton dust standard. Yet, this is exactly what has occurred.

In 1978, NABM and two other similarly situated industries filed suit in the U. S. Court of Appeals seeking to have the court determine that OSHA had not found any evidence that warranted their inclusion. The Court of Appeals suspended the application of the standard against our industry pending this judicial review, and currently OSHA is considering whether to withdraw the standard as it relates to bedding assemblers for further review.

Despite best efforts, however, these events have left the bedding industry in a regulatory twilight zone. In the absence of an enforcable standard, OSHA has recently begun to try to enforce a previously issued dust standard against the bedding assembly industry, despite the fact that the agency had previously given every indication that the old standard had been dropped due to its vagueness and replaced by the new standard. As a result, NABM's members are faced with the conflicting demands of two different standards, the more recent of which could become enforcable at any time, and the older of which is now being enforced against the industry despite the fact that OSHA apparently abandoned it three years ago. This confused and cavalier approach to the regulation of the bedding assembly industry has contributed to a sense that the federal government is working against rather than with American business.

I believe that the goal of the Vice President's Task Force is to remedy just this sort of confusing and unwarranted over-regulation; and I would welcome your help in trying to ensure that the Task Force takes up this problem.

It is my hope that I, along with several members of the association might have a short meeting with you during the next two weeks. It is my hope that we could explain to you briefly the analyses and conclusions reached by the association and how the federal government might restore some sanity to the regulatory process in this area.

Allow me to thank you in advance for your consideration.

Sincerely,

Hal Daub

HAL DAUB
MEMBER OF CONGRESS

HD:sc

AUG 26 1980

17492 ✓

Robert E. Coleman, President
American Textile Manufacturers
  Institute, Inc.
1101 Connecticut Avenue, N.W.
Suite 300
Washington, D. C. 20036

Dear Mr. Coleman:

This is in response to your recent letter concerning further Occupational Safety and Health Administration (OSHA) actions related to the Cotton Dust Standard. We have construed the Supreme Court's recent decision to rule out the Agency's use of cost-benefit analysis in setting standards regulating toxic substances. We intend, of course, to comply with the Supreme Court's rulings.

Members of my staff are continuing to work on the question of whether the Cotton Dust Standard is applicable or should be enforced in areas where the assessment of risk, at least as a threshold finding, has not been made. Furthermore, in the course of gathering information with regard to OSHA's March 31 Advance Notice of Proposed Rulemaking, the staff has obtained much useful material concerning the technical and scientific difficulties being experienced in the primary textile segment of the industry covered by the standard. Through multi-disciplinary collaboration, the staff continues to review and consider state-of-the-art technological innovations, scientific information, and medical opinions that might render portions of the standard faulty or inapplicable.

I hope that the members of your staff will continue their helpful contacts with OSHA. We would appreciate any further information from you or your staff that will aid us in our determinations.

Sincerely,

John Martonik
Deputy Director
Health Standards Programs

APPENDIX B

DON FUQUA, FLA., CHAIRMAN

ROBERT A. ROE, N.J.
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COMMITTEE ON SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES
SUITE 2321 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, D.C. 20515
(202) 225-6371

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ANTHONY C. TAYLOR
ROBERT B. NICHOLAS

DAVID S. JEFFERY
MINORITY STAFF DIRECTOR

October 15, 1982

Dr. Harold R. Imbus
Health & Hygiene, Inc.
640 Forum VI
Greensboro, NC 27408

Dear Dr. Imbus:

I want to thank you for your participation in the Subcommittee on Investigations and Oversight's recent hearing on byssinosis. The problem of byssinosis among cotton textile workers presents a number of difficult issues, and your testimony was very helpful to the Subcommittee in our effort to focus on them.

As with any hearing, time constraints prevented the Subcommittee from asking all the questions that we had for you. Consequently, I have enclosed a short list of questions for you to supplement the actual hearing record. Please answer these questions in writing and return your answers to the Subcommittee staff within ten days. I appreciate your cooperation.

Thank you again for testifying at our hearing. If you have any questions, please feel free to call Steve Owens, Counsel, or Robert B. Nicholas, Chief Counsel/Staff Director, of the Subcommittee at (202) 226-3636.

Sincerely,

Albert Gore, Jr.

Albert Gore, Jr.
Chairman
Subcommittee on Investigations
and Oversight

AG:SOk
Enclosure

Questions for Dr. Harold R. Imbus

1. When did the ATMI first ask you to prepare a study for it on byssinosis among textile workers?

2. Please provide a copy of all correspondence and communications between you and the ATMI relevant to the initiation and conduct of your byssinosis study.

3. Please provide a copy of your contract or agreement with the ATMI to prepare your study.

4. Was the focus or scope of your charge from the ATMI ever altered? If so, in what respect?

5. Please provide a copy of all reports and assessments (preliminary, summary, and final) submitted by you to the ATMI relevant to your byssinosis study.

6. What additional information or data would be needed to qualify your study's findings and data as representative of the textile industry?

Health & Hygiene, Inc.

OCT 22 1982

640 Forum VI, Northline Avenue
Greensboro, North Carolina 27408
(919) 854-2303

October 19, 1982

Mr. Albert Gore, Jr.
U.S. House of Representatives
Suite 2321 Rayburn House Office Building
Washington, D.C. 20515

Dear Mr. Gore:

In response to your questions, my answers are as follows:

1. ATMI first asked me to prepare a study of the pooled data in the textile industry on February 24, 1982.

2. The only correspondence which I am able to find is a letter of transmittal dated April 14, 1982. A copy of this is enclosed.

3. There was no written contract; there was an agreement made on the telephone for me to compile the data. The verbal agreement stipulated that I would be reimbursed based upon the number of hours that were spent on the project.

4. The scope or charge from ATMI was not ever altered. I elected not to use the ELB data after it was obtained. The reasons for this are explained in my letter dated April 14, 1982.

5. I am enclosing for you a copy of the only preliminary report that I have. I would ask that you copy it and return it to me since my copies are limited.

6. I believe that the study's findings are representative of the larger textile companies that have had respiratory surveillance programs for several years. At the time we did the study, there appeared to be very limited available data from other companies that matched dust level with pulmonary function and respiratory questionnaire findings. For example, the ELB data had only a little over 3,000 that could so be matched, out of a total of almost 40,000. Even though there is no corresponding dust level, the 40,000 could conceivably be used to match up length of exposure versus pulmonary function, cigarette smoking, etc. However, the discrepancies that I pointed out in my letter would have to be corrected. It may be that in the forthcoming year (1983) better matching of dust level and pulmonary function data by the independent testing services may be available. The only other way that

I would know to determine if the data were representative would be to have a large scale survey in both the large companies and an adequate sampling of small companies done by an independent contractor.

Sincerely yours,

Harold R. Imbus

Harold R. Imbus, M.D., Sc.D.

glc

Enclosures

Health & Hygiene, Inc.

640 Forum VI, Northline Avenue
Greensboro, North Carolina 27408
(919) 854-2303

April 14, 1982

Dr. John Tritsch
American Textile Mfg. Institute
1101 Connecticut Avenue, N.W. Suite 300
Washington, D.C. 20036

Dear John:

I am transmitting to you these copies of "Medical Surveillance Data in the Cotton Textile Industry." The sources of these data are described in the report itself.

As you are aware, I attempted to obtain data from other sources. One such source might have yielded a large repository of data--the ELB Company. I asked ELB to provide a computer run of their data in the format shown in Exhibits 1-10. This was provided to me by ELB and you have a copy of the report.

Unfortunately, upon review of these data, I elected not to use them because of my concern with several obvious discrepancies. I will not enumerate all of these; however, two such major discrepancies are as follows:

1) There is a listing of 660 employees who were from 0-25 years of age and who had more than 20 years exposure to cotton dust. This would mean that, for this group, even those at the top of the age bracket (25 years) would have had to go to work at the age of 5 in order to fulfill this requirement--a highly unlikely if not impossible event.

2) Altogether, there are 4,944 employees between the ages of 0-25 who have greater than 20 pack years of cigarette smoking. Though not impossible, it is highly unlikely that there would exist such a large group of employees, especially when the group with greater than 20 pack years is more than all of the other cigarette smokers combined for this age category.

Since the critical element of analysis is a comparison of age, years of exposure and pack years of cigarette smoking, I believe that these discrepancies are sufficient enough so as not to warrant their inclusion in this report.

If you have any further questions about the report, please let me know.

Sincerely yours,

Harold R. Imbus, M.D. (dictated but not read by HRI)

HRI:lc

APPENDIX C

DON FUQUA, FLA., CHAIRMAN

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WASHINGTON, D.C. 20515
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ANTHONY C. TAYLOR
ROBERT B. NICHOLAS

DAVID S. JEFFERY
MINORITY STAFF DIRECTOR

October 15, 1982

Dr. James A. Merchant
Department of Preventive Medicine
& Environmental Health
College of Medicine
University of Iowa
Iowa City, Iowa 52242

Dear Dr. Merchant:

I want to thank you for your participation in the Subcommittee on Investigations and Oversight's recent hearing on byssinosis. The problem of byssinosis among cotton textile workers presents a number of difficult issues, and your testimony was very helpful to the Subcommittee in our effort to focus on them.

As with any hearing, time constraints prevented the Subcommittee from asking all the questions that we had for you. Consequently, I have enclosed a short list of questions for you to supplement the actual hearing record. Please answer these questions in writing and return your answers to the Subcommittee staff within ten days. I appreciate your cooperation.

Thank you again for testifying at our hearing. If you have any questions, please feel free to call Steve Owens, Counsel, or Robert B. Nicholas, Chief Counsel/Staff Director, of the Subcommittee at (202) 226-3636.

Sincerely,

Albert Gore, Jr.

Albert Gore, Jr.
Chairman
Subcommittee on Investigations
and Oversight

AG:SOk
Enclosure

Questions for Professor James A. Merchant

1. Please comment on the scientific quality of the National Academy of Sciences report on byssinosis.

2. Please comment on the selection procedure employed by the NAS in selecting the Byssinosis Committee and its chairman.

   (a) Do you believe that the Committee was fully representative of the range of scientific opinion about byssinosis?

   (b) Was the Committee biased toward any particular perspective?

   (c) Was the selection process consistent with the process typically used by the NAS?

3. What are the conclusions of the World Health Organization's most recent study on byssinosis?

   (a) How do these conclusions compare to those of the NAS study?

4. Please comment on the relative scientific merits of the WHO study versus the NAS study.

   (a) What are the scientific strengths and weaknesses of the WHO and NAS studies?

5. Should the findings presented in the study on byssinosis prepared by Dr. Harold Imbus for the American Textile Manufacturers Institute be considered representative of the textile industry?

   (a) If no, why not?

   (b) If no, what further information or data would be needed to qualify Dr. Imbus' study as representative?

6. Please comment on the relative scientific merits of the WHO study versus Dr. Imbus' study.

The University of Iowa
Iowa City, Iowa 52242

College of Medicine
Department of Preventive Medicine
and Environmental Health

1847

November 15, 1982

Albert Gore, Jr.
Chairman
Subcommittee on Investigations
  and Oversight
Committee on Science and Technology
U.S. House of Representatives
Suite 2321 Rayburn House Office Building
Washington, D.C. 20515

Dear Representative Gore:

Thank you for your letter of October 15 which arrived just as I was leaving the office for ten days. Hence, the delay in my response to your questions.

As I was asked previously to comment on the National Academy of Science Report, I have addressed, at least in part, a number of the six questions you have asked me now to elaborate upon. I will, therefore, refer to my testimony when I think it is appropriate. I will answer the questions in the order you have given them to me.

1. Please comment on the scientific quality of the National Academy of Sciences Report on Byssinosis.

   My concern about the scientific quality of the NAS Report on Byssinosis is twofold. Firstly, the committee was heavily represented by pathologists and cotton dust investigators which was appropriate for the principal task of this committee, which was to address research issues on byssinosis. The committee was also represented by three clinicians knowledgeable in the area of byssinosis. The committee, however, was not represented by any biostatisticians, or any individuals who have personally conducted epidemiological studies in the industry. Drs. Weill and Kilburn have been associated with epidemiological studies done by others, however.

   It is in the area of epidemiology and biostatistics, therefore, that I feel the report is weak. These sections did not, in my opinion, reflect adequately the full scientific literature. As a result, as I indicated in my testimony, I believe their conclusion that it remains to be shown whether cotton dust results in chronic lung disease is not supported by the bulk of the epidemiological literature.

2. Please comment on the selection procedure employed by the NAS in selecting the Byssinosis Committee and its chairman.

   a. Do you believe the Committee was fully representative of the range of scientific opinion about byssinosis?

      I believe the controversy which has arisen from this report is indicative of the lack of adequate range of scientific opinion on this committee. It is evident from the minority report and comments made by Dr. Frank Press in his covering letter that some reviewers disagreed with some aspects of this report. In addition, a number of us who have worked for many years in this field felt compelled to disagree with certain aspects of this report.

   b. Was the committee biased toward any particular perspective?

      It is probably inevitable when one deals with a public health issue such as cotton dust, which has been through public hearings and all the way through the Supreme Court, that one will end up with differing views and people who are publicly committed to different views. Some members of the committee were clearly on record as having expressed views consistent with the final report. Whereas, to my knowledge, only Dr. Kilburn was publicly committed through a number of papers, to the view he expressed in his minority opinion.

   c. Was the selection process consistent with the process typically used by the NAS?

      I am afraid that is a question that will have to put to the NAS.

3. What are the conclusions of the World Health Organization's most recent study on Byssinosis?

   a. How do these conclusions compare to those of the NAS study?

      There are probably no important differences in regard discussions on etiology and pathogenesis and research priorities between the two reports. The only area where there is a clear difference is in regard to definition of the disease byssinosis, which in the WHO report is described as a disease with a chronic phase. Indeed, there is a section on chronic health effects arising from cotton, flax and hemp dusts. Both reports conclude that the current cotton dust standard should be maintained. The WHO Report, however, goes on to make certain recommendations about the appropriate standards for other cotton dust exposures (in non-textile cotton exposure sectors) and for a permissable exposure limit for flax dust.

4. Please comment on the relative scientific merits of the WHO Study vs the NAS Study.

a. What are the scientific strengths and weaknesses of the WHO and NAS Studies?

I believe the NAS report and committee was probably stronger in regard to assessment of etiological agents in experimental studies dealing with pathogenesis of cotton dust exposure. This was in part because that was the principal objective of this committee. The WHO Report, on the other hand, gave relatively little attention to etiology and pathogenesis and concentrated on the epidemiology, assessment of environmental exposure and development of the rationale for permissable exposure limits intended to serve as international guidelines, for not only cotton dust, but flax and hemp just as well, This largely reflected the major objective of this report which was to provide permissable exposure limits for these organic dusts.

5. Should the findings presented in the Study on Byssinosis prepared by Dr. Harold Imbus, for the American Textile Manufacturer's Institute be considered representative of the textile industry.

a. If no, why not?

I believe I addressed this point adequately in my testimony.

b. If no, what further information or data would be needed to qualify Dr. Imbus' study as representative?

The major problem with Dr. Imbus' study in regard to its being representative of the entire industry is that it was based upon seven progressive corporate medical surveillance programs. I believe this is interesting and indeed valuable data in showing what the standard can do when systematically implemented over a period of some 10 years. It, however, tells us very little about the vast majority of textile manufacturers who well might not have the resources of these corporations. Therefore, in order to get a representative view of the textile industry, I would agree with Dr. Millar's approach which would be to at this point select a random example of all U.S. textile mills and assess their medical surveillance and environmental data. That approach would provide a reasonable and representative assessment of the current environmental and medical conditions in the U. S. cotton textile industry.

6. Please comment on the relative scientific merits of the WHO Study vs Dr. Imbus' Study.

This is a rather difficult question to answer. I believe Dr. Imbus' study is a descriptive study of corporate medical surveillance programs. It has certain inherent weaknesses which were addressed in my testimony and by others at the hearing. In all fairness, however, Dr. Imbus himself recognized and pointed out some of the obvious biases in this type of data.

The WHO study on the other hand was a committee report intended to be a literature review with an eye toward development of international permissable exposure limits or guidelines to provide guidance to other countries. It was quite different from Imbus' study in that it dealt with the literature rather than with specific data. The WHO study did benefit from inclusion of a number of very knowledgeable individuals who have spent their professional lifetime studying the subject of vegetable dust exposure and who have contributed a great deal to this literature.

I hope these answers satisfactorily address these issues. Should I be able to be of further assistance on this matter, please contact me.

Yours sincerely,

James A. Merchant

James A. Merchant, M.D.,Dr.P.H.
Professor of Epidemiology
and Medicine

JAM/jw

The University of Iowa
Iowa City, Iowa 52242

College of Medicine
Department of Preventive Medicine
and Environmental Health

1847

October 13, 1982

Representative Albert Gore, Jr.
Chairman
Subcommittee on Investigations and
Oversight
Committee on Science and Technology
U. S. House of Representatives
Suite 2321
Rayburn House Office Building
Washington, D.C. 20515

Dear Representative Gore:

I very much appreciated the opportunity to participate in your Cotton Dust Hearing on September 22. I believe the hearing was useful in opening the record on recent cotton dust research, in defining the issues, and in obtaining a few of the answers regarding any changes in regulations dealing with cotton dust exposure.

During the course of questions and answers for our panel, Dr. Jerome Kleinerman representing the National Academy of Sciences was asked why I had not been requested to participate in the National Research Council Expert Committee on Byssinosis. Dr. Kleinerman's reply I consider to be inaccurate, grossly unfair and potentially damaging. It is not the same response he gave me privately several months before. As time did not permit me to respond on this point, I would like to indicate for the record that Dr. Kleinerman had asked me if I would serve as a member of that panel. I indicated I would be pleased to participate. Several weeks later Dr. Kleinerman informed me that my services would not be needed. He indicated that I, as a U. S. Public Health Service officer and government official had been heavily involved in devloping the record for the Cotton Dust Standard. As certain aspects of the Cotton Dust Standard were to be addressed by the National Research Council, it was felt that it would be inappropriate for me to be involved. I accepted this as being reasonable. I did, however, indicate to Dr. Kleinerman that I thought it was important for one member of our Duke research team, which had been heavily involved in epidemiological research on cotton dust in the early 1970's, should be involved in the committee. I was told that Dr. Kaye Kilburn from the University of Southern California would be a member of the committee. Until the time of the hearing on September 22, the issue of my participation in this committee was not discussed with Dr. Kleinerman or any member of the National Academy of Sciences.

Unfortunately, the statements made by Dr. Kleinerman in behalf of the National Academy of Sciences are not only inaccurate but potentially damaging to my scientific reputation. Furthermore, it is unfair to examine the reasons why I may or may not have been asked to participate in that committee without asking the same questions about members who were subsequently asked to serve on the committee. I believe it is in the public interest for your committee to examine the NRC Report legislative history, the criteria for selection of the committee, the potential bias statements of committee members, and the minutes of meetings held by the NRC Committee on Byssinosis.

I have discussed my concern with Mr. Paul Sitton of the National Academy of Sciences. Mr. Sitton has assured me that Dr. Kleinerman's statement was in error and, upon receiving transcripts of the hearing, that a clarification would be made by the Academy. Although I appreciate Mr. Sitton's willingness to do this, a statement for the record buried in the proceedings of a public hearing does not undo damage done at the time of a public hearing subsequently televised nationwide.

I appreciate the opportunity to supplement the record of this hearing. Should you or members of your staff have any other questions for me in regard to cotton dust exposures and health effects, I would be happy to respond to them.

Yours sincerely,

James A. Merchant

James A. Merchant, M.D.,Dr.P.H.
Professor

JAM/jw

NATIONAL RESEARCH COUNCIL
COMMISSION ON LIFE SCIENCES
2101 Constitution Avenue Washington, D.C. 20418

September 30, 1982

James Merchant, M.D.
College of Medicine
The University of Iowa
Iowa City, Iowa 52242

Dear Doctor Merchant:

I am sending the enclosed letter to *Science* in the hope that it will set the record straight. The byssinosis article in which I was quoted failed to report the substance of my discussion with the reporter that was devoted almost entirely to pointing out the passages of the NRC report that dealt with the chronic disability problem. We know that experienced and knowledgeable scientists can come to slightly differing interpretations of data when dealing with the cutting edge of science. I sincerely wish to apologize for any unintended slight to you. Your work in the field is well known to everyone and is an example of the best of medical science.

Sincerely yours,

Daniel L. Weiss

Daniel L. Weiss, M.D.
Commission on Life Sciences
National Research Council

Attachment

NATIONAL RESEARCH COUNCIL
COMMISSION ON LIFE SCIENCES
2101 Constitution Avenue Washington, D.C. 20418

September 30, 1982

The Editor
SCIENCE
1515 Massachusetts Avenue
Washington, D.C. 20005

Dear Sir:

In reference to the SCIENCE news article (News and Comment, 24 September 1982) on OSHA's possible reconsideration of the standard for the regulation of cotton dust, I was distressed to see a comment of mine reported out of context and extracted from a long discussion of the development of the National Academy of Sciences report on byssinosis. To set the record straight, I have sent a letter of apology to Dr. James Merchant for any unintended slight. Dr. Merchant is a respected and productive scientist in the field of occupational disease, particularly noted for his work in byssinosis. In fact, his published work was exhaustively studied and referenced by the Academy group, and his collaborator and colleague, Dr. Kaye Kilburn, was a member of the committee.

Sincerely,

Signed by Daniol L. Weiss, M.D.

Daniel L. Weiss
Commission on Life Sciences
National Research Council
National Academy of Sciences
Washington, D.C. 20418

APPENDIX D

DON FUQUA, FLA., CHAIRMAN
ROBERT A. ROE, N.J.
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COMMITTEE ON SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES
SUITE 2321 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, D.C. 20515
(202) 225-6371

HAROLD P. HANSON
EXECUTIVE DIRECTOR

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DAVID S. JEFFERY
MINORITY STAFF DIRECTOR

October 15, 1982

Dr. Philip Wakelyn
Manager of Environment
 and Safety Technology
National Cotton Council of America
P. O. Box 12285
Memphis, Tennessee 38112

Dear Dr. Wakelyn:

I want to thank you for your participation in the Subcommittee on Investigations and Oversight's recent hearing on byssinosis. The problem of byssinosis among cotton textile workers presents a number of difficult issues, and your testimony was very helpful to the Subcommittee in our effort to focus on them.

As with any hearing, time constraints prevented the Subcommittee from asking all the questions that we had for you. Consequently, I have enclosed a short list of questions for you to supplement the actual hearing record. Please answer these questions in writing and return your answers to the Subcommittee staff within ten days. I appreciate your cooperation.

Thank you again for testifying at our hearing. If you have any questions, please feel free to call Steve Owens, Counsel, or Robert B. Nicholas, Chief Counsel/Staff Director, of the Subcommittee at (202) 226-3636.

Sincerely,

Albert Gore, Jr.

Albert Gore, Jr.
Chairman
Subcommittee on Investigations
 and Oversight

AG:SOk
Enclosure

Questions for the National Cotton Council

1. Please provide a list of all scientists funded for byssinosis research during the past ten years by the National Cotton Council identifying for each the amount of such support.

   (a) Please provide a list of their research topics and the studies they prepared.

   (b) Please provide biographical and professional data on these scientists, including their affiliations with universities, industry, and research groups.

2. Please provide a list of all studies funded by the National Cotton Council and prepared by the above-referenced scientists that were submitted to OSHA since January 1,1982.

3. Which of the studies referenced in Question #1(a) were published in medical or scientific journals?

4. Which of the National Cotton Council studies were examined by the National Academy of Sciences Committee in preparing its report on byssinosis?

NATIONAL COTTON COUNCIL OF AMERICA
POST OFFICE BOX 12285 / MEMPHIS, TENNESSEE 38112
TELEPHONE: (901) 274-9030

October 19, 1982

The Honorable Albert Gore, Jr.
Chairman
Subcommittee on Investigations and Oversight
Committee on Science and Technology
U. S. House of Representatives
2321 Rayburn House Office Building
Washington, D. C. 20515

Dear Mr. Chairman:

Re: Brown Lung Hearings Held by the House Subcommittee on Investigations and Oversight, Committee on Science and Technology

This is in response to your letter of October 15, 1982, which requested answers to four questions. My response to your questions is as follows:

1. The National Cotton Council does not fund research. However, cotton producers through Cotton Incorporated have funded most of the over $10 million worth of scientific research on byssinosis/cotton dust sponsored by the cotton industry since 1971. The Cotton Foundation has sponsored some research also. To obtain the detailed information you desire, you should contact those organizations directly. For a list of the research sponsored by Cotton Incorporated in 1982 and information on their research efforts on byssinosis, see Document No. 2, "Cotton Incorporated Byssinosis Research," which was submitted, at the time of my oral testimony before your subcommittee, as supplemental information to my statement.

2. None.

3. Not applicable.

4. A copy of the National Academy of Sciences' study is already in the hearing record. It was prepared by an independent committee that reportedly reviewed the world literature -- Chapter 2 of the report contains 24 references; Chapter 3, 15 references; Chapter 4, 70 references; Chapter 5, 7 references; Chapter 6, 209 references -- over 325 references were cited. Some of those references were written by me and some were included in proceedings edited by me.

The Honorable Albert Gore, Jr.
October 19, 1982
Page 2

If you have additional questions, we will be happy to give you assistance.

Yours sincerely,

P. J. Wakelyn, Manager
Environmental/Safety Technology

PJW:bis

cc: Dr. Preston Sasser
Cotton Incorporated

Dr. Arlie Bowling
The Cotton Foundation

Mr. Gaylon Booker
National Cotton Council

APPENDIX E

DON FUQUA, FLA., CHAIRMAN

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DAVID S. JEFFERY
MINORITY STAFF DIRECTOR

October 14, 1982

Mr. James H. Martin
c/o Mr. W. Ray Shockley
American Textile Manufacturers Institute
1101 Connecticut Avenue, N.W.
Suite 300
Washington, D.C. 20035

Dear Mr. Martin:

I want to thank you for your participation in the Subcommittee on Investigations and Oversight's recent hearing on byssinosis. The problem of byssinosis among cotton textile workers presents a number of difficult issues, and your testimony was very helpful to the Subcommittee in our effort to focus on them.

As with any hearing, time constraints prevented the Subcommittee from asking all the questions that we had for you. Consequently, I have enclosed a short list of questions for you to supplement the actual hearing record. Please answer these questions in writing and return your answers to the Subcommittee staff within ten days. I look forward as well to meeting with you in the near future to discuss a procedure for orderly access to the ATMI data. I appreciate your cooperation.

Thank you again for testifying at our hearing. If you have any questions, please feel free to call Steve Owens, Counsel, or Robert B. Nicholas, Chief Counsel/Staff Director, of the Subcommittee at (202) 226-3636.

Sincerely,

Albert Gore, Jr.

Albert Gore, Jr.
Chairman
Subcommittee on Investigations
and Oversight

AG:SOk
Enclosure

Questions for ATMI

1. With regard to the ATMI medical survey of December 15, 1981:

   (a) How were the data collected?

   (b) What criteria were utilized in selecting the companies from which the collected data was received?

   (c) What criteria were utilized in selecting the workers about whom data was collected?

   (d) How were the data verified and validated?

   (e) How was confidentiality assured?

   (f) Can the data be considered representative of the textile industry?

2. Please answer the same questions [1(a)-(f)] with regard to the medical study prepared by Dr. Harold Imbus for ATMI.

3. Please provide the dates and substance of all meetings during the last two years, where the cotton dust standard was discussed, between the ATMI and:

   (a) The Occupational Safety and Health Administration,

   (b) The Office of Management and Budget,

   (c) The U. S. Department of Labor,

   (d) The Reagan Task Force on Regulatory Relief.

   (e) The U. S. Chamber of Commerce.

4. Please provide copies of any summaries prepared by the ATMI of the meetings discussed in Question #3, as well as any memoranda pertaining to those meetings.

5. Please provide copies of all correspondence and communications over the last two years which discusses the cotton dust standard and was between the ATMI and the groups, agencies, and departments discussed in Question #3, as well as any memoranda pertaining to such correspondence and communications.

6. When did the ATMI first inform OSHA that the ATMI planned a study of byssinosis among textile workers?

7. How long has the ATMI advocated a 500 ug/m3 PEL for the yarn manufacturing process?

AMERICAN TEXTILE MANUFACTURERS INSTITUTE, INC.
1101 CONNECTICUT AVENUE, N.W., SUITE 300, WASHINGTON, D.C. 20036
TWX: 710-822-9489
TEL: 202/862-0500

November 22, 1982

Honorable Albert Gore, Jr.
Chairman
Committee on Science and Technology
Subcommittee on Investigations and Oversight
U.S. House of Representatives
2321 Rayburn House Office Bldg.
Washington, D.C. 20515

Dear Mr. Chairman:

Enclosed per Mr. Martin's request are responses to questions arising out of the September 22 Subcommittee hearing on byssinosis forwarded with your letter of October 14, 1982, to Mr. James H. Martin care of me at the American Textile Manufacturers Institute. As indicated in Mr. Bulcao's letter of October 19, both Mr. Martin and I have been out of the country, accounting for the delay in response.

If we can be of further assistance, please do not hesitate to inquire.

Sincerely,

W. Ray Shockley
Executive Vice President

WRS/bl
enclosure
cc: James H. Martin, Jr.

Responses to byssinosis questions of October 14, 1982, from the Honorable Albert Gore, Jr., Chairman of the House Committee on Science and Technology Subcommittee on Investigations and Oversight.

1) a. The data were collected for the ATMI medical survey by a questionnaire sent to the entire ATMI corporate membership asking response by filling in numbers to a particuarly posed set of questions.

b. There were no criteria for selection of companies from which data was collected other than having corporate membership in ATMI.

c. Sole criteria for selection of workers about whom data was collected was whether or not they were subject to coverage by the OSHA Cotton Dust Standard.

d. Verification and validation of data were the responsibility of each company submitting data.

e. Confidentiality was established by removing any corporate name or location identifications from questionnaire responses before the accounting firm (Ernst & Whinney) added the figures into the grand totals which became public.

f. In view of the large number of employees represented in the data submitted, we believe the summary figures of the report are generally representative of the textile industry despite the unknowns attributable to the small remaining portion of the cotton textile industry not participating.

2) a. For the study undertaken by Dr. Imbus, data were collected by participating companies under their respective medical surveillance programs, largely in response to requirements of the OSHA Cotton Dust Standard. The data were provided to ATMI by the participating companies in a format that was devised by the ATMI medical subcommittee.

b. The criterion for selection was that the company be an ATMI member, that it have a full time medical director in charge of an in-house corporate medical program, and that it possess computer capacity enabling the company to respond quickly to information requested in the format designed by the ATMI medical subcommittee.

c. Workers chosen were all employees subject to coverage under the OSHA Cotton Dust Standard at the participating companies.

d. Medical directors at the participating companies were responsible for verifiying and validating the data submitted.

e. Confidentiality was assured by aggregating the data from the various companies for purposes of presenting the results of Dr. Imbus' study and by deleting references to company names and plant locations that might otherwise have identified a particular company.

f. As indicated above, the companies participating in Dr. Imbus' study all have full time resident medical directors and in-house corporate medical programs. Such companies are likely to have been among the most diligent members of the industry in anticipating and responding to potential health problems of their employees. Consequently, the working conditions (including dust exposures) of employees at these companies and the medical programs in which they have participated for some years may not be representative of the past experience of the entire textile industry. However, the medical findings reflected in the study should provide a reasonably accurate picture of the health results that one would expect to find at the various levels of cotton dust exposure reflected in the study. In this sense, the study can be viewed as representative of the textile industry as a whole, if the industry were required to follow medical surveillance programs and maintain exposure limits at the levels reflected in Dr. Imbus' study.

3) a. Meetings between representatives of ATMI and the Occupational Safety and Health Administration over the two year period in question are itemized below. Discussions were general in character, covering a variety of regulatory topics including cotton dust, unless specifically indicated otherwise.

2/26/81	Mr. Tritsch of ATMI staff accompanied by P.J. Wakelyn of the National Cotton Council meets with Messrs. Beliles and Martonik of OSHA separately.
3/12/81	ATMI officers meet with Assistant Secretary Thorne Auchter.
5/27/81	Mr. Tritsch meets with Messrs. Brinkerhoff and Martonik together.
6/10/81	Mr. Tritsch accompanied by Dr. Burkhart and Dr. Robards meet with Mr. Martonik to discuss the OSHA compliance field manual for cotton dust.
6/15-16/81	OSHA cotton dust project team members tour five textile mills for background on textile processing.
7/9/81	Mr. Tritsch meets with Mr. Martonik.
9/9/81	Mr. Tritsch meets with Mr. Martonik.
10/1/81	Mr. Tritsch accompanied by P.J. Wakelyn meets with Mr. Martonik.
11/17/81	Mr. Tritsch meets with Mr. Martonik.
1/8/82	ATMI officers again meet with Mr. Auchter to present the results of the medical survey covered by item 1 above.
1/13or15/82	Mr. Tritsch meets with Mr. Martonik.
2/12/82	Mr. Tritsch accompanied by P.J. Wakelyn meets with Messrs. Beliles, Martonik and Smith separately.
2/18/82	Mr. Tritsch accompanied by P.J. Wakelyn meets with Ms. Harwood.
3/12/82	ATMI textile industrial hygienists meet with OSHA staffers Beliles, Braslow and Harwood to discuss numerous technical questions concerning compliance with the cotton dust standard.
4/8/82	OSHA staffers Braslow and Weber accompanied by Centaur Associates representatives visit Mr. Tritsch to examine the cotton dust compliance plans of various companies assembled by ATMI as an accommodation to the Agency.
5/13/82	Mr. Tritsch accompanied by P.J. Wakelyn meets with Messrs. Beliles, Martonik and Smith separately.
7/6/82	Mr. Tritsch meets with Mr. Martonik.
9/3/82	ATMI Safety and Health Committee representatives meet with Messrs. Braslow and Martonik of OSHA staff and representatives of Centaur Associates to discuss feasibility in complying with the cotton dust standard.
10/7/82	Mr. Tritsch meets with Mr. Martonik.

b. No meetings were held with the Office of Management and Budget.

c. Meetings with the U.S. Department of Labor were only those shown above with OSHA.

d. On March 4, 1981, ATMI participated, along with other representatives of cotton producers and processors, in a meeting with Mr. Boyden Gray, special counsel to the President's Task Force on Regulatory Relief, to discuss problems with the OSHA Cotton Dust Standard..

e. ATMI did not meet with the U.S. Chamber of Commerce to consider revision of the Cotton Dust Standard and, indeed, the U.S. Chamber of Commerce is an organization in which ATMI is no longer a member.

4. No summaries or memoranda resulted from the meetings itemized above in 3(a) or 3(d). The medical survey data presented to Assistant Secretary Auchter on January 8, 1982, were promptly released to the public and are included in material already turned over to this subcommittee (See ATMI comments of March 26, 1982 in the OSHA cotton dust docket material submitted for the record by Mr. Martin on September 22, 1982).

Although it is not a summary or memorandum of the 3/4/81 meeting with Mr. Gray cited in 3(d), ATMI submitted to the Task Force on Regulatory Relief a summary of regulatory problems generally. A copy of that summary, which was prepared in response to the letter of April 14, 1981, from Vice President Bush to a wide variety of companies and associations, is enclosed herewith.

5. Communications provided to the Department of Labor have been included as part of the Cotton Dust Standard rulemaking public docket. These materials were presented for inclusion in the Subcommittee hearing record during Mr. Martin's appearance on September 22. See item 4 response for communications with the Task Force on Regulatory Relief.

6. The intent of the question concerning planning of studies of byssinosis is not clear but it is a fact that ATMI has been interested in efforts to monitor the health status of its industry employees exposed to cotton dust. ATMI merely collected by questionnaire a summary of results obtained during the summer and fall of 1981 from monitoring required by the Standard and at the end of the accumlation notified OSHA and released them publicly. The results are the medical survey material addressed in question 1. To assure ATMI of accuracy in tabulation, the accounting firm of Ernst & Whinney totalled up the questionnaire responses. This same material was also submitted during the rulemaking process to OSHA. In comments filed on March 26, 1982, in response to OSHA's notice of advance rulemaking, ATMI also notified OSHA that it had requested Dr. Imbus to make the study referred to in question 2 above, and in due time, Dr. Imbus' report was filed in the formal rulemaking docket.

7. In reference to the question on the length of time ATMI has supported a 500 microgram per cubic meter permissible exposure level for the yarn manufacturing process, ATMI urged this level as early as 1974 as appropriate to protect the health of cotton textile employees when used in combination with work practices and medical surveillance. The record of the OSHA 1977 hearings on cotton dust will bear this out.

AMERICAN TEXTILE MANUFACTURERS INSTITUTE, INC.
1101 CONNECTICUT AVENUE, N.W., SUITE 300, WASHINGTON, D.C. 20036
TWX: 710-822-9489
TEL: 202/862-0500

April 30, 1981

The Vice President
The White House
Washington, D.C. 20500

Dear Mr. Vice President:

In further response to your letter of April 14 regarding the Cabinet-level Task Force on Regulatory Relief, we are pleased to submit the enclosed summaries of review requests.

The issues outlined in the summaries represent those areas where the textile industry most needs regulatory relief. Each imposes significant burdens upon the industry and in some cases require expenditures on non-productive equipment.

Relief will allow the textile industry to further improve its productivity, which already is among the best in manufacturing, and to further help get the American economy moving.

We are grateful for this opportunity to present our priority issues and assure you of our desire to cooperate in every way possible.

Respectfully yours,

W. Ray Shockley
Executive Vice President

WRS/bhs
Copy to Honorable Malcolm Baldridge
Secretary of Commerce

Dr. James C. Miller, III
Presidential Task Force

Mr. C. Boyden Gray,
Office of the Vice President

ATMI's first 10 priority issues are: (not in order of priority)

Clean Air

Cotton Dust

Effluent Guidelines

Hazardous Wastes

Incremental Pricing of Natural Gas

Noise

PURPA

Superfund

Energy Efficiency by Use of Recovered Materials

NSPS for Coal Fired Boilers

SUMMARY OF REQUEST FOR REGULATORY REVIEW

Source of Rule: U.S. Environmental Protection Agency (EPA)

Citation: Clean Air Act

Description of Problems:

1. Prevention of Significant Deterioration (Clean Air Act, Part C, All Sections).

The program implemented by EPA is one of the most detailed and complicated programs ever attempted and requires extensive revision. PSD relies on the setting of allowable increments of deterioration for each area of a state currently meeting air quality standards. Modeling used to determine the increments is unreliable and costly. Further, the program creates extensive delays in permit issuance and constrains industrial development.

It is recommended that PSD increments be limited to Class I areas since the National Ambient Air Quality Standards are designed to protect both health and welfare and are broadly defined to include adverse effects on visibility and vegetation.

2. Non-attainment Areas (Clean Air Act, Part D, All Sections).

Several modifications could be made to ease the burden of non-attainment standards without jeopardizing progress toward attainment. Off-set requirements should be eliminated. The application of Reasonable Available Control Technologies (RACT) for existing sources and Best Available Control Technologies (BACT) for new sources are providing further progress toward attainment and effectively eliminate the availability of off-sets, thereby inhibiting industrial expansion in these areas.

States should also be given authority to determine Best Available Control Technology for their areas given local conditions.

Recommendations:

1. Elimination of Class II and Class III designations.
2. Elimination of off-set requirements.

(over)

3. Changes to existing facilities should be exempted from PSD review unless the emission increase exceeds that for new sources as currently being proposed.

Estimated Cost: Unknown

Estimated Benefit: Undetermined

Originator:

Maggie Dean
Director, Environmental Affairs
American Textile Manufacturers Institute, Inc.
1101 Connecticut Avenue, N.W., Suite 300
Washington, D.C. 20036
(202) 862-0536

SUMMARY OF REQUEST FOR REGULATORY REVIEW

Source of Rule: Occupational Safety and Health Administration, U.S. Department of Labor

Citation: 29CFR 1910.1043 Cotton Dust pursuant to sections 6(b) and 8(c), Occupational Safety and Health Act of 1970 (PL 91-596) (84 Stat. 1593, 1599; 29 U.S.C. 255,257)

Description of Problems: Agency has promulgated a three tiered standard which imposes infeasible requirements on industry for control of cotton dust levels. During 1977 hearings, ATMI suggested an alternate standard which would be achievable and far less costly and would accomplish the desired protection of exposed workers. The industry proposal was not accepted. ATMI appealed to the courts on grounds OSHA overstates the problem, uses meat axe approach which is not cost effective. The Court of Appeals for the District of Columbia upheld the standard and ATMI asked the Supreme Court to review the case. Oral arguments before that Court were held January 21, 1981, and the Court has not yet rendered its decision. Meanwhile, OSHA has instituted a reconsideration of the standard to include cost/benefit analysis and the Supreme Court has been asked to withhold its decision accordingly.

Estimated Cost: During 1977 OSHA hearings, ATMI estimated cost of compliance in excess of $2 billion based on 1974-75 information. OSHA claims an annual cost of $205 million, which ATMI believes to be grossly understated.

Estimated Benefit: OSHA claims standard does not eliminate byssinosis but will prevent nearly 75 thousand cases from occuring, a benefit estimate of $7.5 billion or $751 million annually. Current industry estimates of number of employees showing subjective and objective symptons of byssinosis approximate one percent of those exposed, 2330. ATMI believes the OSHA benefit claim to be grossly overstated.

Other Impact: Many textile manufacturers are switching from cotton to manmade fibers to avoid standard requirements. This has broad and severe implications for the whole cotton producing industry.

(over)

Originator:

John G. Tritsch
Director, Safety & Health
American Textile Manufacturers Institute, Inc.
1101 Connecticut Avenue, N.W., Suite 300
Washington, D.C. 20036
(202) 862-0580

SUMMARY OF REQUEST FOR REGULATORY REVIEW

Source of Rule:	U.S. Environmental Protection Agency (EPA)
Citation:	Effluent Guidelines, Pretreatment Standards and New Source Performance Standards for Textile Mills, 40 CFR Part 410, page 62204, October 29, 1979.
Description of Problems:	EPA issued proposed effluent guidelines for the textile industry October 29, 1979 and proposed revisions January 27, 1981. If promulgated in their present form, the regulations would create severe economic impacts on the industry. The 1976 recommendation in the report to Congress by the National Commission on Water Quantity that Congress postpone the deadline by which municipal, agriculture, and industrial discharges shall be required to meet the 1983 requirements was not implemented. This recommendation was made to allow assesment of the effects of 1977 BPT on the nations streams to determine whether more stringent limitations than the 1977 requirements is justified and desirable. Other recommendations by the Commission to study toxity and to study the need for more restrictive effluent limitations were authorized. In the textile industry where such studies were performed in great depth there is no demonstrated need for implementation of BATEA. Therefore, no more stringent limitations than 1977 BPT is justified. The new source Performance Standards establish limits which are more restrictive than for existing sources and discourage capital improvements, growth, and productivity in the industry. It is unreasonable, therefore, to impose more stringent levels for NSPS than for existing sources. The proposed COD and color limitations cannot be met by the recommended technology and are unnecessary for public health and welfare, and should be eliminated. COD should only be regulated where it can be shown to be pertinent to the achievement of water quality objectives. BCT limits have been inappropriately determined by including size as a factor in setting limits.

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Section 304 (b) (4) (a) of the Clean Water Act requires that BCT be applied to "classes and categories of point sources". Plant size has never before been treated as an acceptable "class or category". This differentiation appears to be an attempt to minimize economic consequences of the standards on smaller plants and at the same time impose overly stringent restrictions on larger plants.

Estimated Cost:

Industry estimates the cost of meeting the BATEA guidelines will cost $302 million with an O&M cost of $31 million per year and will result in the closure of 36 direct discharge plants, the loss of 18,000 jobs, and an increase in the textile price index of 4 percentage points. Industry cost estimates are 380% of EPA estimates.

Estimated Benefit:

The saving of 18,000 jobs and reduction in costs of textile products by 4%.

Recommendation:

ATMI recommends that:

a. The Clean Water Act should be amended to drop BAT where there is no demonstrated need.

b. New Source Performance Standards be no more restrictive than limits for existing sources.

c. Color limitations be dropped.

d. BCT cost test should be recalculated omitting plant size as a factor; thereby providing more appropriate limits.

Originator:

Maggie Dean
Director, Environmental Affairs
American Textile Manufacturers Institute, Inc.
1101 Connecticut Avenue, N.W., Suite 300
Washington, D.C. 20036
(202) 862-0536

SUMMARY OF REQUEST FOR REGULATORY REVIEW

Source of Rule U.S. Environmental Protection Agency (EPA)

Citation: Hazardous Waste Regulations, 40 CFR Parts 260 thru 265, Vol. 45, No. 98, May 19, 1980

Description of Problems:

1. Definition of Solid Waste (Part 261.2) and Regulation of Hazardous Materials Being Recycled or Re-used (Part 261.6)

The May 19, 1980 rule takes the position that materials which are "sometimes discarded", including materials being reused, reclaimed or recycled prior to discarding, and all sludges, even if never discarded are solid wastes and subject to regulation.

This approach discourages reuse of materials such as spent solvents and waste oils because of the regulatory burden imposed by classifying them as a hazardous waste. Materials are currently subjected to hazardous waste storage permits prior to becoming a waste. Material for reuse such as spent solvents are already regulated under OSHA, DOT, TOSCA, and should not be subject to further regulation under RCRA.

2. Inclusion of NPDES Wastewater Treatment Facilities (Part 261.4 (a) (2)).

The above restrictions apply to industrial wastewaters while being collected, stored or treated prior to discharge. This duplicates the NPDES requirements for wastewaters and places an unjust burden on facilities...EPA has correctly excluded certain neutralization facilities which are considered hazardous only because they exhibit the corrosivity characteristic. However, this logical exclusion has not been extended to surface impoundments, which have similar characteristics.

Treatment and collection of wastewaters subject to NPDES requirements should be excluded from regulation under RCRA. Wastewater treatment sludges created by and essential to the treatment process should not be considered wastes until discarded.

3. Degree of Hazard

The regulations fail to take into consideration the degree of hazard of particular

(over)

wastes. The severe economic impact of the regulations, specifically the technical design, operation and financial requirements, are unnecessary for low-hazardous wastes. Standards should be designed according to the degree of hazard to protect public health and environment, based upon an industry classification system similar to S.I.C.

The existing rules base the EP toxicity procedure on the assumption that all wastes will be co-disposed in a municipal landfill. Many industrial wastes are never handled in this manner. Wastes which are not co-disposed should not be subject to an extraction procedure based on co-disposal. Further, the statistical methodology require by Sec. 265.95 does not account for inherent ground water variability.

Estimated Cost: $12.5 million based on $50 thousand per plant for 250 wet processing plants.

Estimated Benefit: Many hazardous wastes could be recycled or disposed of locally. Existing hazardous waste disposal sites would not be overtaxed. Many hazardous wastes would not be transport long distances. Illegal disposal methods would be less likely.

Recommendation: The proposed and promulgated hazardous waste regulations impose unreasonable economic and technical burdens on industry. The negative impacts could be minimized by:

- Eliminating regulation of recycled/reused materials to encourage reuse.
- Eliminating improper testing and monitoring requirements.
- Providing a proper classification system to regulate wastes according to their degree of hazardousness.

Originator:

Maggie Dean
Director, Environmental Affairs
American Textile Manufacturers Institute, Inc.
1101 Connecticut Avenue, N.W., Suite 300
Washington, D.C. 20036
(202) 862-0536

SUMMARY OF REQUEST FOR REGULATORY REVIEW

Source of Rule:	Federal Energy Regulatory Commission (FERC)
Citation:	Natural Gas Policy Act of 1978 (NGPA), Title II, signed into public law by the President on November 9, 1978.
Description of Problem(s):	(1) Places unfair burden on one particular class of consumer, i.e. industrial sector. (2) Requires industry to pay proportionately higher natural gas prices than other sectors of the economy. (3) Results in the displacement of natural gas with foreign oil. (4) For industrial firms where natural gas is essential and there's no technologically feasible substitute, the economics of incremental pricing could ultimately force a partial or full shutdown of operations.
Recommendation:	The Administration should support Congressional repeal of Title II of the Natural Gas Policy Act of 1978, which enacted incremental pricing. Pending legislative remedy, the Administration should encourage the Federal Energy Regulatory Commission to adopt measures which mitigate the impact of incremental pricing, such as making permanent the No. 6 alternative fuel price cap. Additionally, the Administration should oppose rate design schemes, such as those suggested by DOE last year (a version of marginal cost pricing termed "economic cost rates") which abandon basic principles of utility ratemaking.
Estimated Cost:	When Congress passed the NGPA of 1978, oil prices appeared relatively stable. It seemed that, if anything, oil prices would increase more slowly than the prices of certain categories of natural gas under Title I of the NGPA. Further, the Energy Information Administration projected that industrial fuel prices in 1985 would be $2.59 per million Btus for gas and $2.99 and $3.66 per million Btus for residual and distillate oil. Since passage of the Act, events and conditions have rendered these projections inaccurate. The

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prices which industrial users will have to pay for gas and oil in 1985 will far exceed EIA's 1978 estimates:

— The average industrial gas price has already reached $2.89 per million Btus (third quarter 1980, per American Gas Association).

— The retail costs of residual and distillate oils exceeded EIA's projections a year ago ... projections which were not supposed to be reached until 1985.

Since ceiling prices under incremental pricing are tied directly to the price of oil, industry's costs have increased dramatically and are far greater than anticipated in 1978.

Furthermore, as large industrial customers switch to alternate fuels because of incremental pricing, the utility fixed costs they formerly absorbed must be recovered from the remaining customers, primarily residentials.

Recommendation would eliminate unfair cost burden placed on certain industrial users of natural gas. Coupled with decontrol of gas prices, costs would be shared among all classes of consumers.

Estimated Benefit: Title II was designed to assure gas availability at a reasonable price to residential consumers. However, these alleged benefits are aimed at less than one-half of all residential consumers. Those who use electricity, propane, oil ... and those on the intrastate system are excluded. Second, even residential gas users served through interstate pipelines may ultimately face more rapid and larger increases in gas prices than would have occurred without incremental pricing, because of shifting the fixed costs to them.

Other Impact: All consumers, regardless of their source of energy, are penalized by incremental pricing by having to pay the resulting higher prices of goods and services.

Originator: Ronald L. Floor, director, Natural Resources & Market Division, American Textile Manufacturers Institute, Inc., Suite 300, 1101 Connecticut Ave., NW, Washington, DC 20036. Phone: (202) 862-0562.

SUMMARY SHEET ON REGULATORY REVIEW

Source of Rule: Occupational Safety and Health Administration
U.S. Department of Labor

Citation: 29 CFR 1910.95 Occupational Noise Exposure pursuant to sections 6 (a), 6 (b) and 8 (b), Occupational Safety and Health Act of1970 (PL91-596) (84 Stat. 1590, 1593, 1599; 29 U.S.C. 255, 257, 651 et seq.)

Description of Problems: To date, the occupational noise standard remains where it has been for some time based on a permissable exposure limit of 90dB time-weighted average over eight hours. The recent January 16 amendments introduce firm hearing conservation requirements for workers exposed above 85dB, a position ATMI supported during the 1974-1975 OSHA hearings on proposals to lower the permissable exposure levels and to require achievement by engineering controls. The preamble for the January 16 amendments promises additional rule-making on the permissable exposure levels and how they shall be achieved. It is this prospect that poses major concern. If the textile industry is required to meet even the current 90dB standard by engineering controls, achievement will be technologically infeasible for major portions of the industry and prohibitively costly for the balance.

Estimated Cost: During 1974-75 hearings, ATMI estimated $3.0 billion to achieve 90dB standard with only three of eleven major types of textile machinery using engineering controls, To achieve 85dB, loom replacement alone with machinery not yet developed was estimated at $13 billion.

Estimated Benefit: With personnel protective equipment readily available, it's hard to measure totally intangible benefits from engineered solutions.

Other Impact: Benefits (see above) believed illusory as well as intangible.

Originator: John G. Tritsch
Director, Safety & Health
American Textile Manufacturers Institute, Inc.
1101 Connecticut Avenue, N.W., Suite 300
Washington, D.C. 20036
(202) 862-0580

SUMMARY OF REQUEST FOR REGULATORY REVIEW

Source of Rule: U.S. Department of Energy (DOE)

Citation: Titles I and III, Public Utility Regulatory Policies Act (PURPA) of 1978, signed into public law by the President on November 9, 1978.

Description of Problem(s):

(1) Titles I and III of this Act require DOE to create standards and guidelines for electric and gas utilities which must be adopted by all state regulatory commissions, or else rejected with a written explanation. DOE is authorized to intervene in state proceedings and to seek judicial review of such state determinations.

(2) The wide-range of DOE authority and duties pose a substantial threat to traditional state regulatory authority and, thus, seriously jeopardize the ability of state agencies and local utilities to meet the needs and conditions unique to a particular geographical area.

Recommendation: Titles I and III of PURPA should be repealed by Congress.

Estimated Cost & Estimated Benefit:

Because consideration of federally created standards varies from state to state, and because of the uncertainty with regard to the status of already proposed federal standards, estimated costs and benefits cannot be quantified. The prospective costs, however, could certainly involve billions of dollars.

Other Impact: The increased costs to government, utilities and their customers, because of the high complexities of implementing and carrying out this Act, adds to inflationary pressures.

Originator: Ronald L. Floor, director, Natural Resources & Market Division, American Textile Manufacturers Institute, Inc., Suite 300, 1101 Connecticut Ave., NW, Washington, DC 20036. Phone: (202) 862-0562.

SUMMARY OF REQUEST FOR REGULATORY REVIEW

Source of Rule:	U.S. Environmental Protection Agency (EPA)
Citation:	Superfund Regulations, P.L. 96-510, Sec. 103 (a) and (c).
Description of Problems:	On December 11, 1980 the so-called "Superfund" became law. In addition to establishing new taxes to create a $1.6 billion response fund, the Act imposes significant reporting requirements for release of a hazardous substance or for hazardous wastes which were previously stored or disposed.

Sec. 103(a)

The spills notification requirement went into effect upon passage of the Act without the establishment of regulation. Substantial confusion exists over the definition of "reportable quantity". Until the Administrator of EPA establishes a reportable quantity for a specific substance, the reportable quantity will be the amount previously established under the Clean Water Act or one pound for any other substance. These numbers were established with little consideration of their practical effects. Further, the reportable quantity established under the Clean Water Act applies if a substance is included on both the Clean Water Hazardous Substance List and the RCRA Hazardous Waste List, and if it is a product when released. If the substance is a waste when released, it is subject to the one pound limitation. Obviously there is no rationale for allowing up to 1,000 pounds of a product to be released without notification if the same substance is released as a waste in quantities over one pound.

Sec. 103(c)

Any person who stored, treated or disposed of hazardous wastes, or selected a facility for their disposal is required to report to the Agency the existance of such facility and the amount and type of waste to be disposed. Requiring notification of any wastes which meets the EP characteristics will mandate the reporting of many chemical substances of questionable hazardousness. For example, acetic

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acid, caustic soda, castor oil. This notification procedure will be used by EPA to initiate clean-up activities. Federal response actions are only limited when monies from the trust fund are utilized. EPA has unlimited authority when private funds are involved. Clean-up can be required with no demonstration that a hazardous release is occuring and specific engineering controls may be imposed without regard to cost.

The law provides no indemnity for a generator who has diligently followed all RCRA and other applicable requirements in containing, marking, and arranging for disposal of hazardous substances should a release occur subsequent to these actions.

Estimated Cost:

Too early to predict until site notification becomes effective June 9, 1981; we expect administrative costs to run 4 million for the industry yearly.

Estimated Benefit:

While the primary purpose of the legislation was to clean up abandoned waste disposal sites, much of the Agency's funds and manpower are being directed towards spills notification and potential releases from industrial waste disposal sites. Failure of the Agency to establish reasonable criteria for notification and response actions reduces the Agency's ability to clean up truly problem sites and minimizes the benefits to be achieved.

Recommendation:

Regulations revising the reportable quantities are necessary to insure that only releases of amounts with a reasonable likelihood of causing harm must be reported.

Least-cost alternative clean-up or remedial measures that will protect public health should be adopted.

Originator:

Maggie Dean
Director, Environmental Affairs
American Textile Manufacturers Institute, Inc.
1101 Connecticut Avenue, N.W., Suite 300
Washington, D.C. 20036
(202) 862-0536

SUMMARY OF REQUEST FOR REGULATORY REVIEW

Source of Rule: U.S. Department of Energy (DOE)

Citation: National Energy Conservation Policy Act of 1978, Title IV, Part 4, Section 461, signed into public law by the President on November 9, 1978.

Description of Problems: (1) No one-trillion Btu-per-year users exist in those subdivisions of SIC 22 (textile mill products industry) having an increasing, non-zero target.

(2) Established targets are set at zero for those SIC 22 sectors with corporations using more than one trillion Btus of energy annually, except for six categories.

(3) Targets are currently being achieved for five of those six categories and, with regard to the sixth, no ATMI member company required to participate in this reporting program has operations in that category.

Estimated Cost: Minimal in terms of dollars. However, industry sees no need to file reports with DOE through 1987 against established targets of zero percent and, further, no need to report on targets already being achieved.

Estimated Benefit: None to the textile mill products industry, the federal government or American taxpayer.

Other Impact: Thirty-five textile companies annually must report to DOE on their progress toward meeting established targets.

Recommendations: The textile industry should not be required to report to DOE on its use of recovered waste materials.

Originator: Ronald L. Floor, director, Natural Resources & Market Division, American Textile Manufacturers Institute, Inc., Suite 300, 1101 Connecticut Ave., NW, Washington, DC 20036. Phone: (202) 862-0562.

SUMMARY OF REQUEST FOR REGULATORY REVIEW

Source of Rule: Environmental Protection Agency

Citation: NSPS for Industrial Boilers, Clean Air Act Amendments of 1977
44 CFR 49225, August 21, 1979.

Description of Problems: NSPS would require stringent control of emissions from industrial size boilers.

The Clean Air Act amendments require consideration of additional controls in air pollution sources per a priority list. One of the listed items is industrial size boilers. The EPA mecnanism for that control is New Source Performance Standards. The emission limits set by the proposed NSPS would require drastic reduction in particulate matter and sulfur oxide emissions from boilers.

Currently these acceptable reductions are being met by using double mechanical collectors and low-sulfur fuel which accounts for reduction of 90% of the emissions from a boiler. However, in order to achieve the additional 6% required under NSPS, each installation would require an additional $500,000 for baghouse collectors.

The economic feasibility for building boilers would be drastically affected and reduce growth in existing plants and construction of new operations.

The shift from scarce fuel oil to coal would be drastically affected by this increase in cost to meet unrealistic emission limits.

Estimated Cost: $30 to $50 million.

Estimated Benefits: Elimination of these additional requirements would allow continued and expanded use of coal-fired industrial size boilers, avoid unwarranted major costs, and make energy conservation programs more viable.

Originator:
Maggie Dean
Director, Environmental Affairs
American Textile Manufacturers Institute, Inc.
1101 Connecticut Avenue, N.W., Suite 300
Washington, D.C. 20036
(202) 862-0536

ATMI's other priority issues are: (not in order of priority)

Care Labeling

Consolidated Permits

Toxic Substances

EEOC - Three items

Vinson-Trammell Act

Major Fuel Burning Installations

SUMMARY OF REQUEST FOR REGULATORY REVIEW

Source of Rule:	Federal Trade Commission (FTC)
Citation:	Amendment to Trade Regulation Rule Concerning Care Labeling of Textile Products and Leather Clothing.
Description of Problems:	Since 1972, the FTC has had in place a trade regulation rule covering the care labeling of textile wearing apparel and piece goods. In 1976, the FTC proposed an expansion of the rule to include textile items such as draperies, curtains, slipcovers, linens, upholstered furniture, carpets, and rugs. The FTC stated in its January 5, 1981 Federal Register notice that the rule has been approved in substance. The amended rule is unnecessary and unjustified as demonstrated in the record of the proceedings.
Estimated Cost:	Rule is vague but a rough estimate of the added costs is between $9 and $23 million. ATMI will attempt to refine and document these costs and submit additional details later.
Estimated Benefit:	Negligible, perhaps negative. Less information will be provided consumers than is currently done voluntarily. Requirements, like placing a label on the "top" (face) of rolled carpet, will lead to damaged products.
Other Impact:	Because of the specific requirements contained in the proposed rule, less care information will be provided to the consumer than is currently done voluntarily by industry. For example, the requirement to identify specific cleaning methods and agents would "establish" a specific method and agent. This would unfairly lead to the predominant use of that method and agent by consumers and would therefore stifle innovation in the area of improved products. Coverage of seconds and irregulars is another example of unneeded regulation. The principle benefit of such goods is their lower cost to consumers, a benefit what would be vitiated in large

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measure by the imposition of this requirement.

Commissioner Pitofsky stated in the January 5 *Federal Register* notice that "... it seems to me we discharge our regulatory role by leaving the care labeling rule as it is and simply issuing some guides concerning care directions."

Recommendation:

ATMI respectfully suggests that the Commission withdraw its requirement or at a minimum reopen the proceedings to consider alternative more efficient methods of regulation.

Originator:

Hardy B. Poole
Director, Consumer Affairs
American Textile Manufacturers Institute, Inc.
1101 Connecticut Avenue, N.W., Suite 300
Washington, D.C. 20036
(202) 862-0519

SUMMARY OF REQUEST FOR REGULATORY REVIEW

Source of Rule: U.S. Environmental Protection Agency (EPA)

Citation: Consolidated Permit Regulations, 40 CFR Parts 122, 123, 124 and 125

Description of Problems: The purpose of the consolidated permit program was to simplify all permitting for a site for both industry and the regulator. A review of the proposed program plus a working knowledge of the permitting process indicates that the process will only be made more complex. There is no indication in the proposed program that a minor discrepancy in one single area would not delay permitting in all other areas at an individual site. Class action petition on an insignificant issue by unaffected parties giving no liability for capricious action could delay all permitting at the site. It is inherently easier to deal with single issues than with multiple issues.

The program requires extra monitoring which is overly restrictive, unwarranted and would significantly increase the paperwork burden.

1. Sec. 122.53 (d) (7) Effluent Characteristics

Primary industries, including textiles, are required to test their wastewaters for 129 priority pollutants. The imposition of this testing requirement and cost burden is clearly unnecessary. In an affidavit to the U.S. District Court on December 18, 1980, EPA identified 65 pollutants for the textile industry which the Agency decided to exclude from regulation. These were excluded from regulations for all textile subcategories because they were not detected in treated textile effluents by Section 304(h) analytical methods or other state-of-the-art methods.

The NPDES permit regulations should not mandate testing for these pollutants which are excluded from regulation under specific industry guidelines.

2. Sec. 122.62 Establishing NPDES Permit Conditions

All permits issued after June 30, 1981 must establish limits to control toxic pollutants.

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In the absence of specific industry guidelines, these will be established on a case-by-case basis by the permittee using best engineering judgement. EPA's policy against backsliding binds a discharger to these limits even though less stringent effluent limits may be established later.

The Clean Water Act needs revision to provide for extension of the June 30, 1981 compliance date until such time as specific industry guidelines are established.

Recommendation: The program should be totally abolished.

Estimated Cost: $2.5 million.

Estimated Benefit: None.

Originator:
Maggie Dean
Director, Environmental Affairs
American Textile Manufacturers Institute, Inc.
1101 Connecticut Avenue, N.W., Suite 300
Washington, D.C. 20036
(202) 862-0536

SUMMARY OF REQUEST FOR REGULATORY REVIEW

Source of Rule: Environmental Protection Agency (EPA)

Citation: Toxic Substances Control Act (PL 94-469)

Description of Problems: The purpose of the Act is to limit by regulation unreasonable risks of injury to health or the environment due to "manufacture, processing, distribution in commerce, use, or disposal" of chemical substances and mixtures. The Act recognized that man's knowledge of the toxic hazards of chemical substances is limited, requiring testing to fill gaps. The presence of 55 thousand entries in the inventory of existing commercial substances gives dimension to the magnitude of the problem. With resources obviously limited, EPA has been unable to meet an overly ambitious regulatory schedule, and probably has set standards too exacting for achievement without impeding technological innovation. While the principal impact will fall on the chemical industry directly, user industries such as textiles will feel the results chiefly in limiting the future supply of chemical processing preparations and in limiting research activities conducted on behalf of users.

In addition, there will be some impact from regulatory development activity. For example, reporting of findings of significant new threats to health or the environment apply just as well to processors as to manufacturers. Similarly, the intention to require reporting of internal studies on monitoring and other exposure measurement determinations also apply, and can be rather exacting and too rigorously done, enough so to discourage internal monitoring. Furthermore, the required reporting and record retention for alleged threats to health and/or the environment without substantiation as proposed by the Agency would make companies serve as a repository for rumors. Exaggerated proposals for the control for extremely toxic materials such as PCB's threaten costly impact upon many user industries if replacement in all transformer baths is actually required.

Estimated Cost: EPA contractor estimates that the criteria believed necessary for ascertaining the full scope of toxicity hazards posed by any given chemical would require the expenditure of $400,000 to $800,000 per substance tested.

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Estimated Benefit:	Intangible benefits ascribable to limiting unnecessary risks to health and the environment are expected to be substantial but hard to measure.
Other Impact:	The impact upon processor industries such as the textile industry will be felt in a diminished supply of future chemical alternatives. Furthermore, these limited alternatives will not be supported as much as in the past by producer research on behalf of the users. These factors, plus the high cost of testing, work an obvious discrimination against small business and will certainly discourage textile industry research on its own behalf.
Originator:	John G. Tritsch Director, Safety & Health American Textile Manufacturers Institute, Inc. 1101 Connecticut Avenue, N.W., Suite 300 Washington, D.C. 20036 (202) 862-0580

SUMMARY OF REQUEST FOR REGULATORY RELIEF

EQUAL EMPLOYMENT OPPORTUNITY COMMISSION

CHARGES AND INVESTIGATION

Source of Rule: Equal Employment Opportunity Commission

Citation: Section 706 of Title VII, Civil Rights Act of 1964 (42 U.S.C.A. 2000 (e) (5)

Description of Problems: Title VII of the Civil Rights Act of 1964 sets forth, in Section 706, provisions for the Commission to investigate charges as a means to prevent unlawful employment practices. The Commission consistently accepts the complaints of charging parties without first making any preliminary determination whatsoever whether reasonable cause exists as a basis for the charges, preferring to have the respondent prove non-discrimination. The shifting of the practical burden of proof exclusively to the respondent has caused unwarranted and unnecessary expense to industry, and has led to frequent abuses by charging parties and harassment of industry. This practice dilutes effective response to legitimate discrimination charges that the conscientious employer wants to correct as a matter of good business practice.

Estimated Cost: Unknown

Estimated Benefit: Unknown

Other Impact: Continuation of this practice by the Commission threatens the environment in which appropriate resolution of conflict is necessary and materially adds to the expenditure of both time and resources.

Originator:
James A. Morrissey, Secretary
Human Resources Subcommittee
American Textile Manufacturers Institute
1101 Connecticut Avenue, N.W.
Suite 300
Washington, D.C. 20036

SUMMARY OF REQUEST FOR REGULATORY RELIEF

FEDERAL CONTRACT COMPLIANCE PROGRAM

Source of Rule: U.S. Department of Labor

Citation: Executive Order 11246

Description of Problem: Federal contractors and subcontractors, are required to have written Affirmative Action Plans related to employment of females and racial minorities. Because of the extensive record-keeping requirements and the expenses involved, potential suppliers are discouraged from bidding on federal contracts. Quota systems under affirmative action plans disrupt logical hiring and promition procedures and require additional personnel to maintain and administer programs. Compliance reviews conducted by the Office of Federal Contract Compliance go far beyond what is necessary and reasonable. Compliance officers frequently spend several days on site verifying information which has been submitted and interviewing employees. Unless some apparent deficiency is found in examining written reports it should not be necessary to conduct time-consuming, detailed on-site verification. Because on-site verifications are viewed as harassment, many companies decline to bid on federal contracts.

Estimated Costs: While no industry-wide cost figures are available, it is estimated that the cost of the program could be reduced by as much as 75 percent if on-site audits were confined to those where apparent deficiencies appear.

Estimated Benefit: Not Known

Other Impact: Because potential contractors are discouraged from bidding, federal contracting agencies do not have as large a selection of bidders as might otherwise be available, thus creating a situation where a lower bidder might be available under different circumstances.

Originator:
James A. Morrissey, Secretary
Human Resources Subcommittee
American Textile Manufacturers Institute
1101 Connecticut Ave., N.W.
Washington, D.C. 20036

SUMMARY OF REQUEST FOR REGULATORY RELIEF

EEOC SEXUAL HARASSMENT GUIDELINES

Source of Rule: Equal Employment Opportunity Commission (EEOC)

Citation: Guidelines on Discrimination Because of Sex, 29 CFR 1604.11 (Sexual Harassment), pursuant to Section 703 of Title VII of the Civil Rights Act of 1964, as amended.

Description of Problems: On November 10, 1980, EEOC published final guidelines on sexual harassment which significantly expand the scope of conduct constituting sexual harassment and employer liability attaching to such conduct.

Specifically, the guidelines define sexual harassment not only in terms of verbal or physical conduct of a sexual nature which has a direct and adverse effect on an employee's job status, but also as such conduct which creates an intimidating or offensive working environment. Thus, an employee need only demonstrate that conduct of a sexual nature occurred, regardless of whether there were any adverse consequences to such employee's job status.

An employer is responsible for sexual harassment by its supervisory employees regardless of whether the harassment was authorized or even forbidden by the employer, and regardless of whether the employer knew or should have known of its occurrence. In addition, an employer is responsible for sexual harassment by one non-supervisory employee against another, but only if the employer knew or should have known of the conduct and did nothing to correct the situation. Finally, the guidelines state that an employer may even be liable for sexual harassment by non-employees on the employer's premises.

EEOC's guidleines on sexual harassment are too broad, unsupported by case law and represent an unwarranted extension of the protections afforded by Title VII. The degree of vicarious liability placed on employers is unreasonable and renders them vulnerable despite their best efforts to eliminate sexual harassment in the workplace.

Estimated Cost:	Unknown, relates to increased legal exposure.
Estimated Benefit:	Undetermined
Other Impact:	The broad and ambiguous manner in which the guidelines define sexual harassment will encourage the filing of frivolous complaints and jeopardize the integrity of Title VII's prohibition against sex discrimination. It is recommended that the sexual harassment guidelines be withdrawn in their entirety and that complaints of sex discrimination, including claims of sexual harassment, be decided by the Commission and the courts on a case by case basis consistent with developing case law.
Originator:	James A. Morrissey Secretary, Human Resources Subcommittee American Textile Manufacturers Institute 1101 Connecticut Avenue, N.W. Suite 300 Washington, D.C. 20036

SUMMARY OF REQUEST FOR REGULATORY REVIEW

SOURCE OF RULE:	Enforced by Department of Defense and Treasury
CITATION:	10 U.S.C. 2382 and 7300
DESCRIPTION OF PROBLEMS:	The purpose of the Act is to prevent excessive profits on certain military contracts. The Act is redundant, requiring excessive and duplicative record keeping. The need for profit limitation has been superseded by rigorous contracting procedures. In the unlikely event of excessive profits P.L. 87-643 can be used to limit profits.
ESTIMATED COSTS:	Costs to the textile industry alone are not yet available; but, the Department of Defense has estimated the cost of compliance by all contractors to be over $100 million. In addition the record keeping requirements of the Act are so burdensome as to prevent some companies from bidding on government contracts, thereby limiting competition.
ESTIMATED BENEFITS:	Benefits are near zero, because current contracting procedures and other laws restrict excessive profits. Department of Defense Under-Secretary William Perry, in a letter to IRS Commissioner Kurtz has stated "Our statistics on defense contract profit levels lead us to doubt that substantial amounts of excess profits will be collected under the Act... the Vinson-Trammell Act is out of date...."
SUGGESTED ACTION:	Repeal the Act.
ORIGINATION:	Joshua Hamilton American Textile Manufacturers Institute, Inc. 1101 Connecticut Avenue, N.W. Suite 300 Washington, DC 20036 (202) 862-0544

SUMMARY OF REQUEST FOR REGULATORY REVIEW

Source of Rule: U.S. Department of Energy (DOE)

Citation: Powerplant and Industrial Fuel Use Act of 1978, Title II, Subtitle A, Section 202 and Title III, Subtitle A, Section 302. The Act was signed into public law by the President on November 9, 1978.

Description of Problem(s):

(1) A complex set of rules implementing a statute which directs large industrial fuel users to switch from oil and natural gas to coal or some other alternate fuel ... requirements which are unnecessary with decontrol of oil (accomplished) and natural gas (pending). Additionally, natural gas availability has increased dramatically since Act was written.

(2) The regulatory burden associated with this statute prevents the free market from operating as it should, for the benefit of all consumers.

(3) In a Memorandum dated February 12, 1981, from Robert L. Davies, concerning the implementation of the Fuel Use Act Program (attached), Mr. Davies, who is director of the Office of Fuel Conversion, DOE, explained why the Fuel Use Act and FUA regulatory program are not needed.

Recommendation: Congressional repeal of those sections of the Act which establish and implement various measures prohibiting the burning of oil and natural gas in major fuel burning installations.

Estimated Cost: The Fuel Use Act imposes a number of substantial costs on industry. Some costs, such as the expense and construction delays related to seeking an exemption from DOE, are quite obvious. Many costs, however, are "hidden" costs - such as decisions not to replace old, inefficient boiler capacity because a new boiler would be subject to the automatic statutory prohibition applicable to new MFBI boilers. They are, however, no less real.

These costs have been substantially aggravated by DOE's handling of the Fuel Use Act Program. Only 16 industrial companies have been able to obtain exemptions to date from DOE, with the average petition requiring more than 14 months to obtain.

The recommendation presented above would eliminate these costs.

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Estimated Benefit: While the Act has focused attention on coal as a viable energy source, it has served more powerfully as an impediment to sound industrial decision-making.

Other Impact: DOE's regulations have contributed greatly to the administrative problems encountered by industrial users. These regulations far exceed the congressional intent by requiring massive documentation to be filed. Additionally, DOE disregarded congressional intent by adopting an expansive definition of "reconstruction", which makes it more likely that existing units which are repaired will be deemed by DOE to be new MFBI's and subject to the automatic statutory prohibition on new MFBI boilers. Furthermore, DOE has asserted the power to regulate other industrial equipment, including process equipment, at the plant site if an industrial user requests an exemption.

Originator: Ronald L. Floor, director, Natural Resources & Market Division, American Textile Manufacturers Institute, Inc., Suite 300, 1101 Connecticut Ave., NW, Washington, DC 20036. Phone: (202) 862-0562

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[illegible]
[illegible]
MARILYN LLOYD BOUQUARD, TENN.
JAMES J. BLANCHARD, MICH.
DOUG WALGREN, PA.
RONNIE G. FLIPPO, ALA.
DAN GLICKMAN, KANS.
ALBERT GORE, JR., TENN.
ROBERT A. YOUNG, MO.
RICHARD C. WHITE, TEX.
HAROLD L. VOLKMER, MO.
HOWARD WOLPE, MICH.
BILL NELSON, FLA.
STANLEY N. LUNDINE, N.Y.
ALLEN E. ERTEL, PA.
BOB SHAMANSKY, OHIO
RALPH M. HALL, TEX.
DAVE MCCURDY, OKLA.
MERVYN M. DYMALLY, CALIF.

[illegible]
HAMILTON FISH, JR., N.Y.
MANUEL LUJAN, JR., N. MEX.
HAROLD C. HOLLENBECK, N.J.
ROBERT S. WALKER, PA.
EDWIN B. FORSYTHE, N.J.
WILLIAM CARNEY, N.Y.
MARGARET M. HECKLER, MASS.
F. JAMES SENSENBRENNER, WIS.
VIN WEBER, MINN.
JUDD GREGG, N.H.
RAYMOND J. MCGRATH, N.Y.
JOE SKEEN, N. MEX.
CLAUDINE SCHNEIDER, R.I.
JIM DUNN, MICH.
BILL LOWERY, CALIF.

COMMITTEE ON SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES
SUITE 2321 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, D.C. 20515
(202) 225-6371

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[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
ANTHONY C. TAYLOR
ROBERT B. NICHOLAS

GERALD E. JENKS
MINORITY STAFF DIRECTOR

December 3, 1982

Mr. W. Ray Shockley
American Textile Manufacturers Institute
1101 Connecticut Avenue, N.W.
Suite 300
Washington, D.C. 20036

Dear Mr. Shockley:

Mr. Robert Nicholas, Chief Counsel/Staff Director of the Subcommittee on Investigations and Oversight, has informed me that on several occasions he has attempted unsuccessfully to arrange a meeting with you to discuss the procedure by which the Subcommittee will acquire the raw data utilized by Dr. Harold Imbus in his 1982 study of byssinosis among cotton textile workers prepared for the ATMI. As you undoubtedly recall, I specifically requested at the September 22 hearing that this data be provided to the Subcommittee, and Mr. James Martin, who represented your organization at the hearing, agreed to that request. In light of that agreement, I am disturbed that the data has not yet been made available to the Subcommittee staff and that no arrangements to provide the data have been forthcoming.

I see no reason why this matter cannot be resolved swiftly. Accordingly, I am hereby requesting that you meet with Mr. Nicholas and other members of the Subcommittee staff no later than Wednesday, December 8, to discuss the Subcommittee's acquisition of the data or make other satisfactory arrangements by that date to provide the data to the Subcommittee staff. Given our prior agreement and the period of time that has elapsed, I believe that this request is entirely reasonable, and I trust that we can quickly conclude the appropriate arrangements.

Thank you for your cooperation.

Sincerely,

Albert Gore Jr.

Albert Gore, Jr.
Chairman
Subcommittee on Investigations
and Oversight

AG:SOk

AMERICAN TEXTILE MANUFACTURERS INSTITUTE, INC.
1101 CONNECTICUT AVENUE, N.W., SUITE 300, WASHINGTON, D.C. 20036
TWX: 710-822-9489
TEL: 202/862-0500

December 7, 1982

Honorable Albert Gore, Jr.
Chairman
Committee on Science and Technology
Subcommittee on Investigations
and Oversight
U.S. House of Representatives
2321 Rayburn House Office Building
Washington, D.C. 20515

Dear Mr. Chairman:

This in reference to your letter of December 3 concerning the raw data utilized by Dr. Harold Imbus in his 1982 study of cotton textile workers for ATMI.

The medical surveillance information utilized was gathered by the participating companies from data on all their exposed cotton textile employees required under the OSHA occupational standard for cotton dust, 29 CFR 1910.1043 (See Section (h) and appendices B, C and D for the medical portion; see section (d) and appendix A for the exposure monitoring requisites). These activities all took place under the general supervision of the medical directors of those companies (As reported during the September 22 hearings, those companies were Burlington Industries, Cone, WestPoint Pepperell, Cannon Mills, J.P. Stevens, Hanes, Fieldcrest and Dan River).

Availability by computer was an essential ingredient because of the thousands of individual entries involved and not many textile companies had yet acquired the needed computer capability for their employee health programs. Each company was asked to report with respect to employees exposed to cotton dust:

A. How many employed, by each category in B and C and by total, in
    1) opening through roving;
    2) spinning through warping;
    3) slashing and weaving; and
    4) all other.

B. Subdivided by smokers and non-smokers, how many showed
    1) FEV_1 at 60 to 80% of predicted;
    2) FEV_1 at 60% or less;
    3) drop in FEV_1 of 10% or more after exposure;
    4) bronchitis of any grade; and
    5) byssinosis of any grade per questionnaire.

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C. Each of the above assignable to dust level exposures of
   1) 0 to 200 micrograms per cubic meter;
   2) 200 to 500 micrograms per cubic meter; and
   3) above 500 micrograms per cubic meter.

The data provided in response was turned over to Dr. Imbus as aggregated and totalled by ATMI staff. Enclosed are both classes of data compilations (company provided and aggregated) with individual company identifications removed. These constitute the raw data in our possession.

Sincerely,

W. R. Shockley

W. Ray Shockley
Executive Vice President

WRS/bl

BWS received.

Totals of Companies # 1-7

	FEV1 ≤80% S	FEV1 ≤80% NS	FEV1 ≤80% Tot	FEV1 [illegible] S	FEV1 [illegible] NS	FEV1 [illegible] Tot	ΔFEV1 ≥10% S	ΔFEV1 ≥10% NS	ΔFEV1 ≥10% Tot	Byssinosis Any S	Byssinosis Any NS	Byssinosis Any Tot	Bronchitis S	Bronchitis NS	Bronchitis Tot	Employee Totals S	Employee Totals NS	Employee Totals Tot
Open → Roving																		
0-200 μg/M³	184	46	230	42	11	53	40	35	75	20	18	38	156	30	186	1682	1317	2999
200-500 μg/M³	189	39	228	44	4	48	67	19	86	35	6	41	98	21	119	1333	688	2021
≥500 μg/M³	67	21	88	6	4	10	22	11	33	9	2	11	31	10	41	416	223	639
Spin → Warping																		
0-200 μg/M³	550	312	862	101	40	141	119	107	226	27	21	48	327	114	441	4319	4260	8579
200-500 μg/M³	334	166	500	55	22	77	131	93	224	30	15	45	239	90	329	2960	2643	5603
>500 μg/M³	45	17	62	4	2	6	22	12	34	4	3	7	28	8	36	317	289	606
Slash/Weaving																		
0-200 μg/M³	464	139	603	61	13	74	46	30	76	17	6	23	353	69	422	3060	2071	5131
200-500 μg/M³	731	300	1031	149	23	172	171	105	276	30	9	39	364	88	452	5668	4377	10045
>500 μg/M³	185	37	222	33	3	36	45	15	60	9	1	10	109	32	141	1128	625	1753
Other																		
0-200 μg/M³	118	99	217	30	17	47	20	24	44	2	8	10	113	40	153	937	1262	2199
200-500 μg/M³	48	40	88	10	4	14	14	16	30	3	3	6	27	25	52	462	553	1015
>500 μg/M³	29	24	53	3	11	14	1	7	8	1	3	4	23	3	26	207	376	583
Co. # 8	570	203	773	130	16	146	111	32	143	21	8	29	481	110	591	5722	4050	9772
Totals (Exc Co. #8)																		
0-200 μg/M³	1326	646	1972	234	81	321	245	196	441	66	53	119	949	253	1202	9998	8910	18908
200-500 μg/M³	1302	545	1847	258	53	311	383	233	616	98	33	131	728	229	952	10323	8261	18584
>500 μg/M³	326	99	425	46	20	66	90	45	135	23	9	32	186	53	239	2068	1513	3581

COMPANY _ Co. #8 __

AREA: (circle one) [✓ **Preparation** Opening thru Roving] [✓ **Yarn** Spinning thru Warping] [✓ **Slash/Weave**] **Other** Specify ______

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
FEV$_1$ 60-80% No./%													570	203		773
FEV$_1$ 60% or less than No./%													130	16		146
ΔFEV$_1$ 10% greater than or equal to No./%													111	32		143
Byssinosis any grade No./%													21	8		29
Bronchitis No./%													431	110		541
Total No. of Employees													5722	4050		9772

Opening through Roving

	FEV1 60-80%			FEV1 60% or less			Δ FEV1 ≥ 10%			Byssinosis any grade			Bronchitis			Employee Totals		
	Smoke	Non-Smoke	Total	Smoke	Non-Smoke	Total	Smoke	Non-Smoke	Total	Smoke	Non-Smoke	Total	Smoke	Non-Smoke	Total	Smoke	Non-Smoke	Total
Co. #1																		
0-200 μg/M³	12/11.1	5/7.7	17/9.8	1/0.9	0/0	1/0.6	6/5.6	4/6.2	10/5.8	1/0.9	1/1.5	2/1.2	0/0	2/3.1	2/1.2	108	65	173
200-500 μg/M³	29/21.0	6/8.0	35/16.4	4/2.9	2/2.7	6/2.8	10/7.2	3/4.0	13/6.1	2/1.4	0/0	2/0.9	2/1.4	0/0	2/0.9	138	75	213
>500 μg/M³	4/12.9	4/21.1	8/16.0	1/3.2	1/5.3	2/4.0	2/6.5	3/15.8	5/10.0	0/0	1/5.3	1/2.0	2/6.5	1/5.3	3/6.0	31	19	50
Total	45/16.2	15/9.4	60/13.8	6/2.2	3/1.9	9/2.1	18/6.5	10/6.3	28/6.4	3/1.1	2/1.3	5/1.1	4/1.4	3/1.9	7/1.6	277	159	436
Co. #2																		
0-200 μg/M³	78	15	93	8	2	10	22	8	30	9	4	13	66	7	73	675	282	957
200-500 μg/M³	13	4	17	3	0	3	2	1	3	5	1	6	8	1	9	153	67	220
>500 μg/M³	2	0	2	0	0	0	2	0	2	0	0	0	3	0	3	13	4	17
Total	122	27	149	21	2	23	30	13	43	15	5	20	98	16	114	841	353	1194
Co. #3																		
0-200 μg/M³	29	8	37	13	0	13	8	0	8	0	2	2	30	2	32	263	71	334
200-500 μg/M³	60	8	68	22	0	22	31	3	34	12	2	14	47	5	52	454	155	609
>500 μg/M³	5	0	5	1	0	1	2	0	2	0	0	0	0	0	0	11	6	17
Total	101	16	117	37	0	37	45	3	48	13	4	17	81	7	88	767	242	1009
Co. #4																		
0-200 μg/M³	10	12	22	2	2	4	0	0	0	0	1	1	13	2	15	73	48	121
200-500 μg/M³	24	18	42	1	1	2	2	3	5	0	0	0	13	3	16	116	124	240
>500 μg/M³	25	11	36	2	2	4	0	0	0	3	0	3	14	5	19	121	56	177
Total	59	41	100	5	5	10	2	3	5	3	1	4	40	10	50	310	228	538
Co. #5																		
0-200 μg/M³	22	5	27	8	2	10	12	1	13	1	0	1	16	1	17	190	137	327
200-500 μg/M³	48	5	53	11	1	12	18	4	22	9	2	11	21	3	24	351	163	514
>500 μg/M³	23	6	29	2	0	2	14	8	22	5	0	5	10	4	14	172	104	276
Total	93	16	109	21	3	24	44	13	57	15	2	17	47	8	55	713	404	1117
Co. #6																		
0-200 μg/M³	44	50	91	8	5	13	10	22	32	6	10	16	28	16	44	339	666	1005
200-500 μg/M³	14	7	21	2	0	2	4	5	9	7	1	8	5	8	13	121	104	225
>500 μg/M³	8	0	8	0	1	1	2	0	2	1	1	2	2	0	2	68	34	102
Total	63	57	120	10	6	16	16	27	43	14	12	26	35	24	59	528	804	1332
Co. #7																		
0-200 μg/M³	2	1	3	2	0	2	2	0	2	3	0	3	3	0	3	34	48	82
200-500 μg/M³	1	1	2	1	0	1	0	0	0	0	0	0	2	1	3	27	46	73
>500 μg/M³	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total	3	2	5	3	0	3	2	0	2	3	0	3	5	1	6	61	94	155

Spinning through Warping

	FEV_1 60-80%			FEV_1 60% & less			$\Delta FEV_1 \geq 10\%$			Byssinosis any grade			Bronchitis			Employee Totals		
	Smoke	Non-Smoke	Total	Smoke	Non-Smoke	Total	Smoke	Non-Smoke	Total	Smoke	Non-Smoke	Total	Smoke	Non-Smoke	Total	Smoke	Non-Smoke	Total
Co. #1																		
0-200 ug/M³	55/18.8	34/11.0	89/14.8	9/3.1	4/1.3	13/2.2	13/4.4	12/3.9	25/4.2	0/0	0/0	0/0	6/2.0	6/1.9	12/2.0	293	309	602
200-500 ug/M³	68/13.7	46/10.9	114/12.4	8/1.6	3/0.7	11/1.2	43/8.7	23/5.4	66/7.2	3/0.6	3/0.7	6/0.7	15/3.0	14/3.3	29/3.2	497	423	920
>500 ug/M³	20/23.5	5/8.2	25/17.1	3/3.5	1/1.6	4/2.7	8/9.4	7/11.5	15/10.3	2/2.4	0/0	2/1.4	3/3.5	0/0	3/2.1	85	61	146
Total	143/16.3	85/10.7	228/13.7	20/2.3	8/1.0	28/1.7	64/7.3	42/5.3	106/6.4	5/0.6	3/0.4	8/0.5	24/2.7	20/2.5	44/2.6	875	793	1668
Co. #2																		
0-200 ug/M³	[illegible]	34	[illegible]	16	5	23	30	24	54	7	3	10	70	29	99	1268	905	2173
200-500 ug/M³	47	15	62	9	1	10	18	19	37	3	1	4	36	14	52	525	444	965
>500 ug/M³	7	3	10	0	0	0	1	0	1	0	0	0	4	2	6	40	41	81
Total	232	61	293	33	7	40	55	49	104	13	4	17	142	49	191	1833	1390	3223
Co. #3																		
0-200 ug/M³	67	34	101	18	1	19	31	6	37	4	1	5	55	13	68	609	299	908
200-500 ug/M³	83	20	103	18	9	27	37	10	47	16	4	20	95	23	118	864	381	1245
>500 ug/M³	3	1	4	0	0	0	0	0	0	0	0	0	5	0	5	13	7	20
Total	165	57	222	36	8	46	70	19	89	20	5	25	160	36	196	1568	724	2292
Co. #4																		
0-200 ug/M³	87	54	141	9	7	16	3	2	5	3	1	4	94	23	117	567	450	1017
200-500 ug/M³	34	18	52	6	0	6	6	2	8	0	0	0	31	7	38	177	171	348
>500 ug/M³	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	121	72	193	15	7	22	9	4	13	3	1	4	125	30	155	744	621	1365
Co. #5																		
0-200 ug/M³	100	48	148	28	2	30	18	10	28	4	4	8	47	10	57	737	705	1442
200-500 ug/M³	56	19	75	8	2	10	14	15	29	5	3	8	31	12	43	502	524	1026
>500 ug/M³	9	8	17	1	1	2	11	5	16	1	3	4	9	4	13	144	154	298
Total	165	75	240	37	5	42	43	30	73	10	10	20	87	26	113	1383	1383	2766
Co. #6																		
0-200 ug/M³	83	99	182	17	21	38	22	51	73	9	12	21	43	30	73	758	1508	2266
200-500 ug/M³	38	38	76	5	7	12	12	21	33	3	2	5	25	15	40	314	535	849
>500 ug/M³	6	0	6	0	0	0	2	0	2	1	0	1	2	2	4	35	22	57
Total	127	137	264	22	28	50	36	72	108	13	14	27	70	47	117	1107	2065	3172
Co. #7																		
0-200 ug/M³	8	9	17	2	0	2	2	0	2	0	0	0	12	3	15	87	84	171
200-500 ug/M³	8	10	18	1	0	1	1	3	4	0	0	0	4	5	9	81	169	250
>500 ug/M³	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total	16	19	35	3	0	3	3	3	6	0	0	0	16	8	24	168	253	421

Slash / Weave

	FEV_1 60-80%			FEV_1 60% or less			$\Delta FEV_1 \geq 10\%$			Byssinosis any grade			Bronchitis			Employee Totals		
	Smoke	Non-Smoke	Total	Smoke	Non-Smoke	Total	Smoke	Non-Smoke	Total	Smoke	Non-Smoke	Total	Smoke	Non-Smoke	Total	Smoke	Non-Smoke	Total
Co. #1																		
0-200 μg/M³	62/21.1	12/5.9	74/14.9	5/1.7	1/0.5	6/1.2	9/3.1	6/3.0	15/3.0	2/0.7	1/0.5	3/0.6	5/1.7	4/2.0	9/1.8	294	202	496
200-500 μg/M³	187/15.7	72/7.8	259/12.3	20/1.7	4/0.4	24/1.1	37/3.1	25/2.7	62/2.9	1/0.1	2/0.2	3/0.1	19/1.6	3/0.3	22/1.0	1190	923	2113
>500 μg/M³																		
Total	249/16.8	84/7.5	333/12.8	25/1.7	5/0.4	30/1.1	46/3.1	31/2.8	77/3.0	3/0.2	3/0.3	6/0.2	24/1.6	7/0.6	31/1.2	1484	1125	2609
Co. #2																		
0-200 μg/M³	72	3	75	10	2	12	12	3	15	5	0	5	56	5	61	654	266	920
200-500 μg/M³	116	26	142	19	1	20	33	15	48	6	0	6	48	20	68	977	534	1511
>500 μg/M³	68	16	84	9	1	10	11	5	16	2	0	2	31	12	43	429	265	694
Total	387	46	413	74	7	81	104	24	138	23	1	24	260	52	312	2060	1065	3125
Co. #3																		
0-200 μg/M³	7	1	8	0	0	0	0	0	0	0	0	0	5	1	6	44	20	64
200-500 μg/M³	170	40	210	57	3	60	40	12	52	5	2	7	136	19	151	1388	570	1958
>500 μg/M³	86	13	99	16	1	17	24	5	29	3	0	3	61	18	79	945	191	436
Total	273	59	332	79	4	83	87	18	85	8	2	10	202	41	243	1877	781	2658
Co. #4																		
0-200 μg/M³	195	45	240	22	5	27	4	1	5	7	5	12	211	49	260	1072	491	1663
200-500 μg/M³	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
>500 μg/M³	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	195	45	240	22	5	27	4	1	5	7	5	12	211	49	260	1072	491	1563
Co. #5																		
0-200 μg/M³	70	13	83	13	1	14	12	7	19	2	0	2	40	3	43	554	369	923
200-500 μg/M³	127	34	161	25	1	26	32	11	43	12	1	13	99	10	109	1170	852	2022
>500 μg/M³	28	8	36	8	1	9	10	5	15	4	1	5	15	2	17	247	167	414
Total	225	55	280	43	6	49	54	23	77	18	2	20	154	15	169	1971	1388	3359
Co. #6																		
0-200 μg/M³	58	65	123	11	4	15	9	13	22	1	0	1	35	7	42	442	723	1165
200-500 μg/M³	131	128	259	28	14	42	29	42	71	6	4	10	66	36	102	943	1498	2441
>500 μg/M³	3	0	3	0	0	0	0	0	0	0	0	0	2	0	2	7	2	9
Total	192	193	385	39	18	57	38	55	93	7	4	11	103	43	146	1392	2223	3615

Other

	FEV1 60-80%			FEV1 60% or less			ΔFEV1 ≥10%			Byssinosis-Any			Bronchitis			Employee Totals		
	Smoke	Non-Smoke	Total	Smoke	Non-Smoke	Total	Smoke	Non-Smoke	Total	Smoke	Non-Smoke	Total	Smoke	Non-Smoke	Total	Smoke	Non-Smoke	Total
Co. #4																		
0-200 μg/M³	28	11	39	17	9	26	2	0	2	0	0	0	29	10	39	258	150	408
200-500 μg/M³																		
>500 μg/M³																		
Total																		
Co. #2																		
0-200 μg/M³	2	0	2	0	0	0	0	1	1	0	0	0	3	1	4	14	5	19
200-500 μg/M³	1	0	1	2	0	2	0	0	0	0	0	0	1	1	2	34	13	47
>500 μg/M³	21	5	26	1	1	2	0	2	2	0	2	2	15	3	18	168	96	264
Total	25	6	31	3	1	4	0	4	4	0	2	2	19	5	24	216	114	330
Co. #6																		
0-200 μg/M³	78	84	162	11	8	19	17	23	40	2	8	10	68	26	94	569	1047	1616
200-500 μg/M³	42	32	74	5	4	12	13	9	22	3	3	6	21	21	42	373	461	834
>500 μg/M³	8	19	27	2	10	12	1	5	6	1	1	2	8	0	8	39	280	319
Total	128	135	263	21	22	43	31	37	68	6	12	18	97	47	144	981	1788	2769
Co. #7																		
0-200 μg/M³	10	4	14	2	0	2	1	0	1	0	0	0	13	3	16	96	60	156
200-500 μg/M³	5	8	13	0	0	0	1	7	8	0	0	0	5	3	8	55	79	134
>500 μg/M³	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total	15	12	27	2	0	2	2	7	9	0	0	0	18	6	24	151	139	290

COMPANY Co. #1

AREA: (circle one) [✓ Preparation Opening thru Roving] Yarn Spinning thru Warping Slash/Weave Other Specify

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
FEV_1 60-80% No./%	12 11.1%	5 7.7%		17 9.8%	29 21.0%	6 8.0%		35 16.4%	4 12.9%	4 21.1%		8 16.0%	45 16.2%	15 9.4%		60 13.8%
FEV_1 60% or less than No./%	1 0.9%	0 0%		1 0.6%	4 2.9%	2 2.7%		6 2.8%	1 3.2%	1 5.3%		2 4.0%	6 2.2%	3 1.9%		9 2.1%
ΔFEV_1 10% greater than or equal to No./%	6 5.6%	4 6.2%		10 5.8%	10 7.2%	3 4.0%		13 6.1%	2 6.5%	3 15.8%		5 10.0%	18 6.5%	10 6.3%		28 6.4%
Byssinosis any grade No./%	1 0,9%	1 1.5%		2 1.2%	2 1.4%	0 0%		2 0.9%	0 0%	1 5.3%		1 2.0%	3 1.1%	2 1.3%		5 1.1%
Bronchitis No./%	0 0%	2 3.1%		2 1.2%	2 1.4%	0 0%		2 0.9%	2 6.5%	1 5.3%		3 6.0%	4 1.4%	3 1.9%		7 1.6%
Total No. of Employees	108	65		173	138	75		213	31	19		50	277	159		436

COMPANY Co. #1

AREA: (circle one) Preparation Opening thru Roving [✓ Yarn Spinning thru Warping] Slash/Weave Other Specify ________

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
FEV$_1$ 60-80% No./%	55 18.8%	34 11.0%		89 14.8%	68 13.7%	46 10.9%		114 12.4%	20 23.5%	5 8.2%		25 17.1%	143 16.3%	85 10.7%		228 13.7%
FEV$_1$ 60% or less than No./%	9 3.1%	4 1.3%		13 2.2%	8 1.6%	3 0.7%		11 1.2%	3 3.5%	1 1.6%		4 2.7%	20 2.3%	8 1.0%		28 1.7%
ΔFEV$_1$ 10% greater than or equal to No./%	13 4.4%	12 3.9%		25 4.2%	43 8.7%	23 5.4%		66 7.2%	8 9.4%	7 11.5%		15 10.3%	64 7.3%	42 5.3%		106 6.4%
Byssinosis any grade No./%	0 0%	0 0%		0 0%	3 0.6%	3 0.7%		6 0.7%	2 2.4%	0 0%		2 0.2%	5 0.6%	3 0.4%		8 0.5%
Bronchitis No./%	6 2.0%	6 1.9%		12 2.0%	15 3.0%	14 3.3%		29 3.2%	3 3.5%	0 0%		3 2.1%	24 2.7%	20 2.5%		44 2.6%
	293	309		602	497	423		920	85	61		146	875	793		1668

COMPANY Co. #1

AREA: (circle one) Preparation Opening thru Roving Yarn Spinning thru Warping [✓ Slash/Weave] Other Specify ________

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
FEV$_1$ 60-80% No./%	62 21.1%	12 5.9%		74 14.9%	187 15.7%	72 7.8%		259 12.3%					249 16.8%	84 7.5%		333 12.8%
FEV$_1$ 60% or less than No./%	5 1.7%	1 0.5%		6 1.2%	20 1.7%	4 0.4%		24 1.1%					25 1.7%	5 0.4%		30 1.1%
ΔFEV$_1$ 10% greater than or equal to No./%	9 3.1%	6 3.0%		15 3.0%	37 3.1%	25 2.7%		62 2.9%					46 3.1%	31 2.8%		77 3.0%
Byssinosis any grade No./%	2 0.7%	1 0.5%		3 0.6%	1 0.1%	2 0.2%		3 0.1%					3 0.2%	3 0.3%		6 0.2%
Bronchitis No./%	5 1.7%	4 2.0%		9 1.8%	19 1.6%	3 0.3%		22 1.0%					24 1.6%	7 0.6%		31 1.2%
	294	202		496	1190	923		2113					1484	1125		2609

COMPANY _ Co. # 1

AREA: (circle one) ALL [✓ **Preparation** Opening thru Roving] [✓ **Yarn** Spinning thru Warping] [✓ **Slash/Weave**] **Other** Specify ____________

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
FEV_1 60-80% No./%	129 18.6%	51 8.9%		180 14.2%	284 15.6%	124 8.7%		408 12.6%	24 20.7%	9 11.3%		33 16.8%	437 16.6%	184 8.9%		621 13.2%
FEV_1 60% or less than No./%	15 2.3%	5 0.9%		20 1.6%	32 1.8%	9 0.6%		41 1.3%	4 3.4%	2 2.5%		6 3.1%	51 1.9%	16 0.8%		67 1.4%
ΔFEV_1 10% greater than or equal to No./%	28 4.0%	22 3.8%		50 3.9%	90 4.9%	51 3.6%		141 4.3%	10 8.6%	10 12.5%		20 10.2%	128 4.9%	83 4.0%		211 4.5%
Byssinosis any grade No./%	3 0.4%	2 8 0.3%		5 0.4%	6 0.3%	5 0.4%		11 0.3%	2 1.7%	1 1.3%		3 1.5%	11 0.4%	8 0.4%		19 0.4%
Bronchitis No./%	11 1.6%	12 2.1%		23 1.8%	36 2.0%	17 1.2%		53 1.6%	5 4.3%	1 1.3%		6 3.1%	52 2.0%	30 1.4%		82 1.7%
	695	576		1271	1825	1421		3246	[illegible]	80		[illegible]	[illegible]	[illegible]		[illegible]

COMPANY Co. #2

AREA: (circle one) Preparation Opening thru Roving | Yarn Spinning thru Warping | Slash/Weave | [✓ Other Specify Knitting]

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
[illegible]	15.4 2	0 0	0 0	10.5 2	4.0 1	0 0	0 0	2.1 1	14.4 18	5.2 5	7.0 3	9.8 26	12.0 22	4.7 6	5.4 3	8.4 31
[illegible]	0 0	0 0	0 0	0 0	4.0 1	0 0	11.0 1	4.3 2	0 0	1.0 1	2.3 1	.8 2	.5 1	.8 1	3.6 2	1.1 4
[illegible]	0 0	20 1	0 0	5.3 1	0 0	0 0	0 0	0 0	0 0	2.1 2	0 0	.8 2	0 0	3.1 4	0 0	1.1 4
[illegible]	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	2.1 2	0 0	.8 2	0 0	1.6 2	0 0	.5 2
[illegible]	23.1 3	20.0 1	0 0	21.1 4	0 0	7.7 1	11.1 1	4.3 2	12.0 15	3.1 3	0 0	6.8 18	9.8 18	3.9 5	1.8 1	6.5 24
	13	5	1	19	25	13	9	47	125	96	43	264	184	128	56	368

COMPANY Co. #2

AREA: (circle one) Preparation Opening thru Roving — Yarn Spinning thru Warping — [✓ Slash/Weave] — Other Specify ________

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
[illegible]	11.4 7	0 0	7.1 1	7.9 8	6.5 5	8.3 3	0 0	6.3 8	0 0	0 0	0 0	0 0	10.0 25	3.0 4	5.3 4	7.2 33
... less [illegible]	1.6 1	3.8 1	0 0	2.0 2	5.2 4	0 0	0 0	3.1 4	0 0	0 0	0 0	0 0	4.0 10	1.5 2	1.3 1	2.8 13
[illegible]	0 0	0 0	0 0	0 0	5.2 4	8.3 3	7.1 1	6.3 8	0 0	0 0	0 0	0 0	3.2 8	2.3 3	2.6 2	2.8 13
...inosis ...grade	0 0	0 0	0 0	0 0	1.3 1	0 0	7.1 1	1.6 2	0 0	0 0	0 0	0 0	1.2 3	0 0	1.3 1	.9 4
...itis	8.2 5	0 0	0 0	5.0 5	3.9 3	2.8 1	7.1 1	3.9 5	0 0	0 0	0 0	0 0	7.2 18	3.0 4	1.3 1	5.0 23
	61	26	14	101	77	36	14	127	0	0	0	0	249	133	76	458

COMPANY Co. #2

AREA: (circle one)

- Preparation — Opening thru Roving
- Yarn — Spinning thru Warping
- [✓ Slash/Weave]
- Other — Specify ______

Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
12.3 49	1.3 3	8.3 15	8.2 67	12.8 82	4.6 23	11.9 29	9.7 134	16.2 48	6.0 16	15.2 20	12.1 84	10.9 267	3.7 62	10.2 91	8.4 420
2.0 8	.4 1	.6 1	1.2 10	1.2 8	.2 1	2.9 7	1.2 16	2.0 6	.4 1	2.3 3	1.4 10	1.7 42	.3 5	2.3 21	1.4 68
2.0 8	.75 3	2.2 4	1.8 15	3.6 23	2.4 12	2.1 5	2.9 40	3.4 10	1.9 5	.8 1	2.3 16	3.1 75	1.8 31	2.1 19	2.5 125
1.0 4	0 0	.6 1	.6 5	.5 3	0 0	.4 1	.3 4	.7 2	0 0	0 0	.3 2	.7 17	.1 1	.2 2	.4 20
10.0 10	2.1 5	6.1 11	6.8 56	5.8 37	3.8 19	2.9 7	4.6 63	8.8 26	4.5 12	3.8 5	6.2 43	8.0 197	2.9 48	4.9 44	5.8 289
398	240	181	819	643	498	243	1384	297	265	132	694	2452	1677	896	5025

COMPANY Co #2

AREA: (circle one) Preparation Opening thru Roving | Yarn Spinning thru Warping | [✓ Slash/Weave] | Other Specify ________

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
[illegible]	12.2 56	1.1 3	8.2 16	8.2 75	12.1 87	4.9 26	11.3 29	9.4 142	16.2 48	6.0 16	15.2 20	12.7 84	10.8 292	3.6 66	9.8 95	8.3 453
[illegible]	2.0 9	.8 2	.5 1	1.3 12	1.7 12	.2 1	2.7 7	1.3 20	2.0 6	.4 1	2.3 3	1.4 10	1.9 52	.4 7	2.3 22	1.5 81
[illegible]	1.7 8	1.1 3	2.0 4	1.6 15	3.8 27	2.8 15	2.3 6	3.2 48	3.4 10	1.9 5	.8 1	2.3 16	3.1 83	1.9 34	2.2 21	2.5 138
[illegible]	.9 4	0 0	.5 1	.5 5	.6 4	0 0	.8 2	.4 6	.7 2	0 0	0 0	.3 2	.7 20	.1 1	.3 3	.4 24
[illegible]	9.8 45	1.9 5	5.6 11	6.6 61	5.6 40	3.7 20	3.1 8	4.5 68	8.8 26	4.5 12	3.8 5	6.2 43	8.0 215	2.9 52	4.6 45	5.7 312
	459	266	195	920	720	534	257	1514	297	265	132	694	2701	1810	972	5483

COMPANY Co. #2

AREA: (circle one) [✓ Preparation Opening thru Roving] Yarn Spinning thru Warping Slash/Weave Other Specify ____

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
	8.5 [illegible]	5.3 15	12 21	9.7 93	7.9 9	6.0 4	10.3 4	10.0 17	12.5 1	0 0	20 1	11.8 2	11.1 89	5.8 27	11.5 33	9.5 149
[illegible]	.74 5	.71 2	1.7 3	1.0 10	2.6 3	0 0	0 0	1.4 3	0 0	0 0	0 0	0 0	1.9 15	.4 2	2.1 6	1.5 23
[illegible]	2.4 16	2.8 8	3.4 6	3.1 30	.9 1	1.5 1	2.6 1	1.4 3	25 2	0 0	0 0	11.8 2	2.7 22	2.8 13	2.7 8	2. 43
[illegible]	.9 6	1.4 4	1.7 3	1.4 13	4.4 5	1.5 1	0 0	2.7 6	0 0	0 0	0 0	0 0	1.5 12	1.1 5	1.0 3	1. 20
[illegible]	7.9 53	2.5 7	7.4 13	7.6 73	6.1 7	1.5 1	2.6 1	4.1 9	25 2	0 0	20 1	17.6 3	9.7 78	3.4 16	6.8 20	7. 114
	[illegible]	282	175	957	114	67	39	220	8	4	5	17	803	469	292	1564

COMPANY Co. #2

AREA: (circle one) Preparation Opening thru Roving [✓ Yarn Spinning thru Warping] Slash/Weave Other Specify ______

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
[illegible]	11.5 109	3.8 34	12.7 41	8.5 184	7.9 32	3.4 15	12.5 15	6.4 62	25 7	6.7 3	0 0	11.8 10	10.7 173	3.8 61	11.4 59	7.8 293
V1 60% less [illegible]	1.5 15	.55 5	.93 3	1.1 23	1.7 7	.2 1	1.7 2	1 10	0 0	0 0	0 0	0 0	1.5 25	.4 7	1.5 8	1.1 40
V1 10% [illegible] after [illegible] or [illegible] to	2.4 23	2.7 24	2.2 7	2.5 54	3.5 14	4.3 19	3.3 4	3.8 37	0 0	0 0	8.3 1	1.2 1	2.5 41	3.0 49	2.7 14	2.8 104
[illegible]	.64 6	.33 3	.31 1	.46 10	.5 2	.2 1	.8 1	.4 4	0 0	0 0	0 0	0 0	.6 10	.2 4	.6 3	.5 17
[illegible]itis %	6.4 61	3.2 29	2.8 9	4.5 99	7.9 32	3.2 14	5.0 6	5.4 52	10.7 3	4.4 2	8.3 1	7.1 6	7.6 123	3.0 49	3.7 19	5.1 191
[illegible]	944	905	324	2173	405	440	120	965	28	45	12	85	1623	1609	519	3751

1980

COMPANY Co. #3

AREA: (circle one) [✓ Preparation Opening thru Roving] Yarn Spinning thru Warping Slash/Weave Other Specify

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
FEV$_1$ 60-80% No./%	9.3 21	11.3 8	22.2 8	11.1 31	12.2 44	5.2 5	17.4 16	11.2 65	42.9 3	0 0	33.3 2	29.4 5	11.9 74	6.6 16	18.6 27	117
FEV$_1$ 60% or less than No./%	5.3 12	0 0	2.8 1	3.9 13	3.6 13	0 0	9.8 4	3.6 22	14.3 1	0 0	0 0	5.9 1	4.3 27	0 0	6.9 10	3.7 37
ΔFEV$_1$ 10% greater than or equal to No./%	2.4 1	0 0	5.6 2	2.4 8	8.0 29	1.9 3	2.2 2	5.4 34	28.6 2	0 0	0 0	11.8 2	6.3 39	1.2 3	4.2 46	4.6 48
Byssinosis any grade No./%	0	2.8 2	0	1.6 2	1.9 7	1.3 2	5.4 5	2.3 14	0	0	0	0	1.3 8	1.7 4	3.4 5	1.7 17
Bronchitis No./%	11.9 27	2.8 2	8.3 3	9.6 32	10.8 39	3.2 5	8.7 8	8.6 52	0	0	0	0	11.1 69	2.9 7	8.3 12	8.7 88
Total No. of Employees	227	71	36	331	362 24	155	92	609	7	6	4	17	622	242	145	1009

1750

COMPANY Co. #3

STW+TRS

AREA: (circle one) Preparation Opening thru Roving [✓ Yarn Spinning thru Warping] Slash/Weave Other Specify

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
FEV$_1$ 60-80% No./%	10.7 53	11.4 34	12.5 14	11.1 101	9.5 69	5.2 20	10.4 14	8.3 103	30.0 3	14.3 1	0	20.0 4	10.4 136	7.8 57	11.1 29	9.7 222
FEV$_1$ 60% or less than No./%	3.0 15	0.3 1	2.7 3	2.1 19	1.8 13	2.4 9	3.7 5	2.2 27	0	0	0	0	2.1 28	1.1 8	1.4 10	2.0 46
ΔFEV$_1$ 10% greater than or equal to No./%	5.6 28	2.0 4	2.7 3	4.1 37	4.1 30	2.6 10	5.2 7	3.8 47	0	0	0	0	4.6 60	2.6 19	3.8 10	3.9 89
Byssinosis any grade No./%	0.4 2	0.3 1	0.4 1	0.4 5	1.8 13	1.0 4	2.2 3	1.6 20	0	0	0	0	1.2 16	0.7 5	1.5 4	1.1 25
Bronchitis No./%	9.9 49	4.3 13	5.4 6	7.5 68	12.1 88	6.0 23	5.2 7	9.5 118	50.0 5	0	0	25.0 5	11.2 147	5.0 36	5.0 13	8.4 194
Total No. of Employees	497	299	113	908	730	381	134	1245	10	7	3	20	1307	724	261	2292

1980

COMPANY Co. #3

AREA: (circle one) Preparation Opening thru Roving | Yarn Spinning thru Warping | [✓ Slash/Weave] | Other Specify

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
FEV$_1$ 60-80% No./%	13.8 5	0.5 1	33.3 2	13.1 8	13.1 132	7.0 40	12.0 38	10.7 210	18.4 62	6.8 13	6.8 20.5 24	15.5 99	14. 209	7.2 59	14.1 64	12.0 332
FEV$_1$ 60% or less than No./%	0	0	0	0	4.1 44	0.5 3	4.1 13	3.0 60	4.0 13	.52 1	2.5 3	2.7 17	4.0 61	0.5 4	4.0 18	3.0 83
ΔFEV$_1$ 10% greater than or equal to No./%	0	0	0	0	2.6 28	2.1 12	2.8 12	2.7 52	4.9 16	2.6 5	6.8 8	4.5 29	3.0 46	2.2 18	4.4 21	3.0 85
Byssinosis any grade No./%	0	0	0	0	0.5 5	0.3 2	0	0.6 7	0.6 2	0	0.8 1	0.5 3	0.4 7	0.2 2	0.2 1	0.36 10
Bronchitis No./%	13.2 5	5.0 1	0	9.4 6	10.3 110	3.33 19	7.0 22	7.7 151	18.5 51	7.4 18	8.5 10	12.4 79	11.3 120	5.0 41	7.0 32	8.9 243
Total No. of Employees	38	20	6	64	1072	570	316	1958	328	191	117	636	1494	817	453	2764

Cont'd

ALL PLANTS (1980)

* FVC = <80%
FEV1/FVC = <75%

S = SMOKER
NS = NON SMOKER

		BYSSINOSIS HISTORY GRADE					BRONCHITIS GRADE	(1-5 yr)	(5-10 yr)	(10 + yr)		FEV1 % PREDICTED					−Δ FEV1 %			
		NORMAL	1/2	1	2	TOTAL	NORMAL	1	2	3	TOTAL	NORMAL 80+	60-80	-60	OTHER* ABNOR	TOTAL	NORMAL 0-5	5-10	10+	TOTAL
OPEN THRU CARD	0 - .2	93/47	/1			121	60/46	8/1	2/1	3/	121	61/34	6/9	2/2	4/3	121	71/48	2/		121
	.2 - .5	116/124				240	103/121	4/3	9/		240	91/105	19/12	1/1	5/6	240	106/108	8/13	2/3	240
	.5 +	118/56	2/		1/	177	107/51	10/4	1/1	3/	177	94/43	21/10	2/2	4/1	177	109/52	12/4		177
	TOTAL	534	5		1	538	488	30	14	6	538	428	77	10	23	538	444	39	5	538
YARN PREP	0 - .2	564/449	3/1			1017	473/427	71/11	18/8	5/4	1017	471/389	70/45	9/7	17/9	1017	541/428	23/20	3/2	1017
	.2 - .5	177/171				348	146/164	28/4	1/1	3/2	348	137/153	32/18	6/	2/	348	164/159	7/10	6/2	348
	.5 +																			
	TOTAL	1361	4			1365	1210	114	28	13	1365	1150	165	22	28	1365	1292	60	13	1365
SLASH & WEAVE	0 - .2	1065/486	5/4	2/1		1563	861/442	151/34	44/13	16/2	1563	855/441	142/36	22/5	53/9	1563	1020/482	48/8	4/1	1563
	.2 - .5																			
	.5 +																			
	TOTAL	1551	9	3		1563	1303	185	57	18	1563	1296	178	27	62	1563	1502	56	5	1563
OTHER	0 - .2	258/150				408	229/140	19/4	6/5	4/1	408	213/130	28/11	8/3	9/6	408	245/145	11/5	2/	408
	.2 - .5																			
	.5 +																			
	TOTAL	408				408	369	23	11	5	408	343	39	11	15	408	390	16	2	408
EXPOSURE LEVEL	0 - .2	1960/1132	8/6	2/1		3104	1620/1055	249/50	90/27	27/8	3104	1600/994	246/101	41/17	83/27	3104	1873/1103	84/33	9/5	3104
	.2 - .5	293/295				588	249/285	32/7	10/1	2/2	588	228/258	51/30	7/1	7/6	588	270/267	15/23	8/5	588
TOTAL SUBJECTS	.5 +	118/56	2/		1/	177	107/51	10/4	1/1	3/	177	94/43	21/10	2/2	4/1	177	91/70	12/4		177
EXPOSURE LEVEL PERCENTAGES	0 - .2	63.04/36.41	.26/.19	.06/.03		99.99%	52.20/33.93	8.01/1.61	2.75/.87	.87/.26	100%	51.46/31.97	7.96/3.25	1.32/.55	2.67/.87	100%	60.33/35.48	2.70/1.06	.29/.10	100%
	.2 - .5	49.83/50.17				100%	42.35/48.47	5.44/1.19	1.90/.17	.34/.31	100%	38.78/43.88	8.67/5.10	1.19/.17	1.19/1.02	100%	45.92/45.41	2.55/3.91	1.36/.85	100%
	.5 +	66.67/31.64	1.13/		.56/	100%	60.45/28.81	5.65/2.26	.56/.56	1.69/	99.98%	53.11/24.29	11.86/5.65	1.13/1.13	2.26/.56	99.99%	51.41/39.55	6.78/2.26		100%

TOTALS	TOTAL NORMAL	TOTAL ABNORMAL	TOTAL NORMAL	TOTAL ABNORMAL	TOTAL NORMAL (80 + %)	TOTAL ABNORMAL (<80% ETC.)	TOTAL NORMAL (< 5%)	TOTAL ABNORMAL 5-10	TOTAL ABNORMAL 10 +	TOTAL SMOKER	TOTAL NON
NUMBER	2371/1483	13/7	1979/1391	404/100	1922/1295	462/195	2238/1410	111/60	17/8	2381	1490
PERCENTAGES	61.20/38.28	.34/.18	51.08/35.91	10.43/2.58	49.61/33.43	11.93/5.03	57.77/37.17	2.87/1.55	.44/.21	61.53	38.46
GRAND TOTALS	3854/99.48%	20/<1%	3370/86.99%	504/13.00%	3217/83.04%	657/16.95%	3849/99.35%	25/.64%		2384	1490

COMPANY. Co. #5

AREA: (circle one) [✓ Preparation Opening thru Roving] Yarn Spinning thru Warping Slash/Weave Other Specify ______

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
FEV$_1$ 60-80% No./%	16 10.7	5 3.6	6 15.0	27 8.3	39 14.2	5 3.1	9 11.8	53 10.3	18 13.6	6 5.8	5 12.5	29 10.5	73 13.1	16 4.0	20 12.8	109 9.8
FEV$_1$ 60% or less than No./%	5 3.3	2 1.5	3 7.5	10 3.1	6 2.2	1 0.6	5 6.6	12 2.3	2 1.5	0 0.0	0 0.0	2 0.7	13 2.3	3 0.7	8 5.1	24 2.1
ΔFEV$_1$ 10% greater than or equal to No./%	8 5.3	1 0.7	4 10.0	13 4.0	16 5.8	4 2.5	2 2.6	22 4.3	11 8.3	8 7.7	3 7.5	22 8.0	35 6.3	13 3.2	9 5.8	57 5.1
Byssinosis any grade No./%	1 0.7	0 0.0	0 0.0	1 0.3	6 2.2	2 1.2	3 3.9	11 2.1	4 3.0	0 0.0	1 2.5	5 1.8	11 2.0	2 0.5	4 2.6	17 1.5
Bronchitis No./%	15 10.0	1 0.7	1 2.5	17 5.2	19 6.9	3 1.8	2 2.6	24 4.7	9 6.8	4 3.8	1 2.5	14 5.1	43 7.7	8 2.0	4 2.6	55 4.9
Total No. of Employees	150	137	40	327	275	163	76	514	132	104	40	276	557	404	156	1117

COMPANY . Co. #5

AREA: (circle one)

Preparation Opening thru Roving

[✓ Yarn Spinning thru Warping]

Slash/Weave

Other Specify ______

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
FEV$_1$ 60-80% No./%	74 12.8	48 6.8	26 16.5	148 10.3	46 11.1	19 3.6	10 11.2	75 7.3	7 5.7	8 5.2	2 9.1	17 5.7	127 11.4	75 5.4	38 14.1	240 8.7
FEV$_1$ 60% or less than No./%	16 2.8	2 0.3	12 7.6	30 2.1	8 1.9	2 0.2	0 0.0	10 1.0	1 0.8	1 0.6	0 0.0	2 0.7	25 2.2	5 0.4	12 4.5	42 1.5
ΔFEV$_1$ 10% greater than or equal to No./%	16 2.8	10 1.4	2 1.3	28 1.9	13 3.1	15 2.9	1 1.1	29 2.8	10 8.2	5 3.2	1 4.5	16 5.4	39 3.5	30 2.2	4 1.5	73 2.6
Byssinosis any grade No./%	3 0.5	4 0.6	1 0.6	8 0.6	5 1.2	3 0.6	0 0.0	8 0.8	1 0.8	3 1.9	0 0.0	4 1.3	9 0.8	10 0.7	1 0.4	20 0.7
Bronchitis No./%	44 7.6	10 1.4	3 1.9	57 4.0	30 7.3	12 2.3	1 1.1	43 4.2	9 7.4	4 2.6	0 0.0	13 4.4	83 7.5	26 1.9	4 1.5	113 4.1
Total No. of Employees	579	705	158	1442	413	524	89	1026	122	154	22	298	1114	1383	269	2766

COMPANY Co. #5

AREA: (circle one) **Preparation** Opening thru Roving **Yarn** Spinning thru Warping [✓ **Slash/Weave**] **Other** Specify ______

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
FEV$_1$ 60-80% No./%	59 13.3	13 3.5	11 10.0	83 9.0	93 10.5	34 4.0	34 11.8	161 8.0	16 9.2	8 4.8	12 16.2	36 8.7	168 11.2	55 4.0	57 12.1	280 8.3
FEV$_1$ 60% or less than No./%	12 2.7	1 0.3	1 0.9	14 1.5	16 1.8	1 0.1	9 3.1	26 1.3	6 3.5	1 0.6	2 2.7	9 2.2	34 2.3	3 0.2	12 2.5	49 1.5
ΔFEV$_1$ 10% greater than or equal to No./%	11 2.5	7 1.9	1 0.9	19 2.1	24 2.7	11 1.3	8 2.8	43 2.1	7 4.0	5 3.0	3 4.1	15 3.6	42 2.8	23 1.7	12 2.5	77 2.3
Byssinosis any grade No./%	1 0.2	0 0.0	1 0.9	2 0.2	10 1.1	1 0.1	2 0.7	13 0.6	3 1.7	1 0.6	1 1.4	5 1.2	14 0.9	2 0.1	4 0.8	20 0.6
Bronchitis No./%	36 8.1	3 0.8	4 3.6	43 4.7	83 9.4	10 1.2	16 5.6	109 5.4	15 8.7	2 1.2	0 0.0	17 4.1	134 8.9	15 1.1	20 4.2	169 5.0
Total No. of Employees	444	369	110	923	883	852	287	2022	173	167	74	414	1500	1388	471	3359

COMPANY Co. #6

AREA: (circle one) [✓ **Preparation** Opening thru Roving] **Yarn** Spinning thru Warping **Slash/Weave** **Other** Specify

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
FEV_1 60-80% No./%	41	50		91	14	7		21	8	0		8	63	57		120
FEV_1 60% or less than No./%	8	5		13	2	0		2	0	1		1	10	6		16
ΔFEV_1 10% greater than or equal to No./%	10	22		32	4	5		9	2	0		2	16	29		43
Byssinosis any grade No./%	6	9		15	7	1		8	1	1		2	14	11		25
Area	313	570		883	112	94		206	67	29		96				
Bronchitis No./%	18	16	~~44~~	44	5	8		13	2	0		2	35	24		59
Total No. of Employees	339	666		1005	121	104		225	68	34		102	528	804		1332

COMPANY Co. #6

AREA: (circle one) Preparation Opening thru Roving [✓ Yarn Spinning thru Warping] Slash/Weave Other Specify

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
FEV$_1$ 60-80% No./%	83	99		182	38	38		76	6	0		6	127	137		264
FEV$_1$ 60% or less than No./%	17	21		38	5	7		12	0	0		0	22	28		50
ΔFEV$_1$ 10% greater than or equal to No./%	22	51		73	12	21		33	2	0		2	36	72		108
Byssinosis any grade No./%	9	12		21	3	2		5	1	0		1	13	14		27
None	713	1300	~~20~~	2013	306	471		777	34	22		56				
Bronchitis No./%	43	30		73	25	15		40	2	2		4	70	47		117
Total No. of Employees	~~674~~ ~~1508~~ 758	1508		2266	314	535		849	35	22		57	1107	2065		3,172

COMPANY Co. #6

AREA: (circle one) Preparation Opening thru Roving Yarn Spinning thru Warping [✓ Slash/Weave] Other Specify

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
FEV$_1$ 60-80% No./%	58	65		123	131	128		259	3	0		3	192	193		285
FEV$_1$ 60% or less than No./%	11	4		15	28	14		42	0	0		0	39	18		57
ΔFEV$_1$ 10% greater than or equal to No./%	9	13		22	29	42		71	0	0		0	38	55		93
Byssinosis any grade No./%	1	0		1	6	4		10	0	0		0	7	4		11
None	397	624		1021	890	1269		2139	6	2		8				
Bronchitis No./%	35	7		42	66	36		102	2	0		2	103	43		146
Total No. of Employees	442	723		1165	943	1498		2441	7	2		9	1392	2223		3615

COMPANY Co. #6

AREA: (circle one) Preparation Opening thru Roving Yarn Spinning thru Warping Slash/Weave [✓ Other Specify]

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
FEV$_1$ 60-80% No./%	77	84		161	42	32		74	8	19		27	127	135		262
FEV$_1$ 60% or less than No./%	12	8		20	8	4		12	2	10		12	22	22		44
ΔFEV$_1$ 10% greater than or equal to No./%	17	23		40	13	9		22	1	5		6	31	37		68
Byssinosis any grade No./%	2	8		10	3	3		6	1	1		2	6	12		18
None	529	864		1393	350	417		767	38	265		303				
Bronchitis No./%	68	26		94	21	21		42	8	0		8	97	47		144
Total No. of Employees	569	1047		1616	373	461		834	39	280		319	981	1788		2769

1980

COMPANY Co. # 7 — PLANTS C & D

AREA: (circle one) Preparation Opening thru Roving | Yarn Spinning thru Warping | Slash/Weave | [✓ Other Specify CIR. KNIT]

	Cotton Dust Level µg/M3 173 AV. of M7's 200 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
FEV_1 60-80% No./%	5.7 9	2.5 4	.6 1	8.9 14									5.7 9	2.5 4	.6 1	8.9 14
FEV_1 60% or less than No./%	1.6 2			1.6 2									1.6 2			1.6 2
$AFEV_1$ 10% greater than or equal to No./%	.6 1			.6 1									.6	1		.6 1
Byssinosis any grade No./%	0													0		
Bronchitis No./%	7.7 12	1.9 3	.6 1	10.2 16									7.7 12	1.9 3	.6 1	10.2 16
Total No. of Employees	90	60	6	156									90	60	6	156

1980

COMPANY Co. #7 ___ AREA: (circle one) Preparation Opening thru Roving Yarn Spinning thru Warping Slash/Weave Other Specify [✓ CIR. KNIT.]

PLANTS A c̄ B

	Cotton Dust Level µg/M3 ___ 0-200				Cotton Dust Level µg/M3 297 AV. 376 + 216 200-500				Cotton Dust Level µg/M3 ___ >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
FEV$_1$ 60-80% No./%					3.7 5	5.9 8		9.7 13					3.7 5	5.9 8		9.7 13
FEV$_1$ 60% or less than No./%					0								0			
ΔFEV$_1$ 10% greater than or equal to No./%					.7 1	5.2 7		5.9 8					.7 1	5.2 7		5.9 8
Byssinosis any grade No./%					0								0			
Bronchitis No./%					3.7 5	2.2 3		5.9 8					3.7 5	2.2 3		5.9 8
Total No. of Employees					54	79	1	134					54	79	1	134

1980

SEP 20 1981

COMPANY Co. #7

COMBINED TOTALS
ALL DUST LEVELS 0-500

AREA: (circle one) ALL [✓ Preparation Opening thru Roving] [✓ Yarn Spinning thru ~~Warping~~ WINDING] ~~Slash/Weave~~ [✓ Other Specify KNITTIN]

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
FEV$_1$ 60-80% No./%																67
FEV$_1$ 60% or less than No./%																8
ΔFEV$_1$ 10% greater than or equal to No./%																16
Byssinosis any grade No./%																3
Bronchitis No./%																54
Total No. of Employees													360	486	20	866

1980

COMPANY Co. #7

PLANT C

AREA: (circle one) Preparation [✓ Opening thru Roving] Yarn Spinning thru Warping Slash/Weave Other Specify

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
FEV$_1$ 60-80% No./%	1.3 1	1.3 1	1.3 1	.39 3									1.3 1	1.3 1	1.3 1	3.9 3
FEV$_1$ 60% or less than No./%	1.3 1	0	1.3 1	2.6 2									1.3 1	0	1.3 1	2.6 2
ΔFEV$_1$ 10% greater than or equal to No./%	1.3 1		1.3 1	2.4 2									1.3 1		1.3 1	2.6 2
Byssinosis any grade No./%	2.6 2		1.3 1	3.9 3									2.6 2		1.3 1	3.9 3
Bronchitis No./%	2.4 2		1.3 1	3.9 3									2.6 2		1.3 1	3.9 3
Total No. of Employees	27	48	7	82									27	48	7	82

1980

COMPANY Co. #7
PLANTS B&D

AREA: (circle one) [✓ Preparation Opening thru Roving] Yarn Spinning thru Warping Slash/Weave Other Specify

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 331 200-500 AV. 286 + 376				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
FEV_1 60-80% No./%					.8 1	.8 1		1.6 2					.8 1	.8 1		1.6 2
FEV_1 60% or less than No./%					.8 1			.8 1					.8 1			.8 1
ΔFEV_1 10% greater than or equal to No./%					0								0			
Byssinosis any grade No./%					0								0			
Bronchitis No./%					1.6 2	.8 1		2.4 3					1.6 2	.8 1		2. 3
Total No. of Employees					25	46	2	73					25	46	2	73

1980

COMPANY Co. #7
PLANT C

AREA: (circle one) Preparation Opening thru Roving [✓ Yarn Spinning thru WINDING ~~Warping~~] Slash/Weave Other Specify

	Cotton Dust Level µg/M3 106 0-200				Cotton Dust Level µg/M3 200-500				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
FEV_1 60-80% No./%	3.5 6	5.3 9	1.2 2	10.0 17									3.5 6	5.3 9	1.2 2	10.0 17
FEV_1 60% or less than No./%	.5 1		.5 1	1.2 2									.5 1		.5 1	1.2 2
$AFEV_1$ 10% greater than or equal to No./%	1.2 2			1.2 2									1.2 2			1.2 2
Byssinosis any grade No./%	0			0									0			0
Bronchitis No./%	7.0 12	1.7 3		8.7 15									7.0 12	1.7 3		8.7 15
Total No. of Employees	83	84	4	171									83	84	4	171

1980

COMPANY Co. #7
PLANTS B & D

AREA: (circle one) Preparation Opening thru Roving [✓ Yarn Spinning thru Warping WINDING.] Slash/Weave Other Specify

	Cotton Dust Level µg/M3 0-200				Cotton Dust Level µg/M3 214 200-500 AV. 221 & 207				Cotton Dust Level µg/M3 >500				TOTAL			
	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT	S	N	EX	TOT
FEV$_1$ 60-80% No./%					3.2 8	4.0 10		7.2 18					3.2 8	4.0 10		7.2 18
FEV$_1$ 60% or less than No./%					.4 1			.4 1					.4 1			.4 1
ΔFEV$_1$ 10% greater than or equal to No./%					.4 1	1.2 3		1.6 4					.4 1	1.2 3		1.6 4
Byssinosis any grade No./%					0	0		0					0	0		0
Bronchitis No./%					1.6 4	2.0 5		3.6 9					1.6 4	2.0 5		3.6 9
Total No. of Employees					81	169		250					81	169		250

APPENDIX F

STATEMENT OF THORNE G. AUCHTER
ASSISTANT SECRETARY OF LABOR
FOR OCCCUPATIONAL SAFETY AND HEALTH
BEFORE THE SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT
OF THE COMMITTEE ON SCIENCE AND TECHNOLOGY

September 22, 1982

Mr. Chairman:

I am pleased to be here today. Accompanying me is Dr. R. Leonard Vance, Director of Health Standards Programs for the Occupational Safety and Health Administration (OSHA). Dr. Vance's organization has responsibility within OSHA for the review and development of occupational health standards.

Since the questions in your letter of invitation are relevant to OSHA's present review of the cotton dust standard, it would be useful to set the stage with a brief summary of that standard's history.

BACKGROUND

Although medical researchers have recognized for nearly three centuries that textile mill workers suffer from a high prevalence of respiratory disease, government regulation of dust levels is a fairl recent approach to improving health conditions among mill workers. The first attempt to regulate the problem came not in the United States, but in England, where byssinosis was recognized as an occupational disease in 1942. The disease was assumed at that time to be peculiar to English mills.

As a result of accumulating evidence of the potential health hazard from cotton dust, the American Conference of Government Industrial Hygienists placed cotton dust on its list of substances for which occupational exposure limits were recommended. In 1966, the Conference adopted a level of 1000 micrograms of cotton dust per cubic meter of air as its recommended standard. In 1968, this exposure limit was adopted for firms producing goods for sale to the Federal Government under the terms of the Walsh-Healey Public Contracts Act.

It was not until 1971 that studies of byssinosis were undertaken in the United States; these showed a disease prevalence of between twenty and thirty percent in employees in cotton carding operations.

This same 1000 microgram standard was later adopted by OSHA for application to all private sector employers. Evidence of the need for a more comprehensive standard was accumulating, however, through epidemiological research in the United States and Great Britain.

In 1974, the National Institute for Occupational Safety and Health (NIOSH) published a criteria document recommending a limit of 200 micrograms of lint-free respirable dust per cubic meter of air, and including mandatory programs of medical management and surveillance, exposure monitoring, employee training, recordkeeping, and work practices.

In December 1976, OSHA proposed a standard for lint-free respirable cotton dust with a permissible employee exposure limit of 200 micrograms per cubic meter, averaged over an 8-hour period. The proposal also provided for measurement of employee exposure, methods of compliance, personal protective equipment, training, work practices including housekeeping, medical surveillance, signs and recordkeeping.

On June 23, 1978, after the public hearings process was complete, OSHA promulgated a new standard for lint-free respirable cotton dust which set the permissible exposure limit (PEL) at 200 micrograms for yarn manufacturing operations and at 750 micrograms for slashing and weaving operations, where the dust includes significant amounts of non-cotton particles. In the knitting processes and in the non-textile industries, the PEL was fixed at 500 micrograms because there was insufficient evidence in those sectors to support the lower exposure level. Subsequent to the establishment of this level, questions have been raised concerning the risk and justification for even the 500 microgram level.

In addition to the PEL, the June 1978 standard originally provided for:

--engineering controls in preference to work practices and/or personal protective equipment as a primary means of exposure control;

--regular monitoring of the work environment;

--medical surveillance of exposed workers;

--development of compliance plans in every affected establishment;

--warning signs;

--wage protections in the case of removal from a job for medical reasons; and

--employee training.

Washed cotton was defined and excluded from coverage under the standard. Cotton growing and harvesting, exposure in the maritime industry, and the manufacturing and distribution of finished textile products were all excluded. A separate cotton ginning standard was also issued in June 1978, but was later vacated by the Fifth Circuit Court of Appeals for lack of demonstration of significant risk. (Texas Independent Ginners v. Marshall, 630 F. 2d 398 (1980).)

The cotton dust standard was to become effective on September 4, 1978, but full compliance with engineering control requirements was postponed until 1982. This deadline was extended until 1984 by the previous Administration because litigation delayed the initial effective date.

Until engineering controls are installed, employers are to provide dust masks and to require that employees use them if they are exposed to levels of cotton dust above the PEL. Monitoring, training, medical surveillance, and certain other provisions of the standard are also in effect.

Stays and Litigation:

Since the cotton dust standard was first issued in June, 1978, it has received significant attention in the courts. Various portions of the standard have been challenged and one of those challenges was settled by the Supreme Court. The courts have vacated or stayed various provisions of the standard; OSHA has also stayed enforcement of the standard in certain areas to review available data as to health effects. The result has been a *de facto* narrowing of the scope of the standard.

First, the standard was challenged as to health effects and feasibility in *AFL-CIO* v. *Marshall*, 617 F. 2d (1979) in the District of Columbia Circuit Court of Appeals. The Court upheld the standard for the textile industry on both grounds. This decision was then appealed to the Supreme Court, which in *American Textile Manufacturers Institute, Inc*. (ATMI) v. *Donovan*, 101 S. Ct. 2478 (1981), upheld the standard for the textile sector on challenges as to significant risk, and feasibility, and denied the existence of a statutory requirement for performing cost-benefit analysis, except perhaps for setting standards-setting priorities under section 6(b) of the Occupational Safety and Health Act. The Supreme Court vacated the provision of the standard for the retention of wage levels for employees removed from high-exposure areas because of inability to wear respirators.

Second, the D.C. Court vacated the standard for the cotton seed oil industry for lack of evidence of economic feasibility.

Third, the previous OSHA administration stayed the standard for the cotton warehousing and classing industries in the summer of 1980 to consider whether significant health risks existed in light of the Supreme Court's decision on OSHA's standard for benzene in Industrial Union Department AFL-CIO v. American Petroleum Institute, 448 U.S. 607 (1980). The court in that decision required OSHA to demonstrate significant risk in setting standards and to demonstrate also that such risk is lessened by the action taken.

For similar reasons, OSHA has tentatively stayed the standard for the knitting and hosiery industries. A major new health study, which has been submitted to the public for comment, appears to indicate a low level of risk in the knitting industry. OSHA is now reviewing the medical surveillance and monitoring data submitted by the knitting industry to determine an appropriate level of coverage of the industry.

Also, the District of Columbia Circuit Court of Appeals stayed the standard for the waste processing, cotton batting, bedding and upholstery industries in order to allow OSHA to review the evidence of significant risk. After an extensive review of the record, OSHA has concluded that the evidence presented in the preamble to the 1978 standard may not have provided an adequate statement of rationale for coverage of these industries in light of the Supreme Court's decision on benzene. Accordingly, OSHA requested in February 1982, and received in March, a remand of the standard from the court for purposes of performing the review. The Court retained jurisdiction and is monitoring our progress.

Administrative Considerations:

In addition to the issue of significant risk, which has not been resolved, and the questions left open by the courts, the Regulatory Flexibility Act of 1980 and Executive Order 12291 of February 17, 1981, require agency review of regulations in light of their economic and other impacts. The Executive Order stipulates, among other requirements for improving government regulation, that regulations be tested by cost-benefit analysis to the extent that law permits. In a Federal Register Notice of March 31, 1981, OSHA requested information on the relation of costs and benefits of the standard in addition to other information regarding some of the problem areas just mentioned. It should be pointed out that at the time of this Notice, the Fifth Circuit Court of Appeals had stated that OSHA was required by its Statute to perform cost-benefit analysis.

The cotton dust standard was selected for early review because of its litigation history and problems in its enforcement. Briefly, OSHA had identified problems in the scope of the standard, in the basic definition of cotton dust, in the use of the vertical elutriator as the primary cotton dust sampling device, and in several other areas. OSHA also wished to explore the use of an action level as a means of addressing some of these problems; that is, a level below the PEL reached by an employer, at which there might be some modification of the surveillance and monitoring requirements.

In June 1981 in its decision in the case of American Textile Manufacturers v. Donovan, the Supreme Court determined that the Occupational Safety and Health Act does not permit cost benefit analysis to be used to determine exposure levels to hazardous agents or substances. Instead, the Court concluded that Congress had imposed only a test of feasibility in prescribing a level of protection which would ensure the greatest health and safety protection to workers. The decision, however, permitted cost-effectiveness analysis to be used in selecting the control options.

Staff work continued on the other areas in the standard which needed addressing. On February 9, 1982, OSHA published a second Advance Notice of Proposed Rulemaking (ANPR) requesting comment on these areas and bringing to the public's attention the Supreme Court's decision. This new ANPR was published for the reasons stated above and because progress was being made on studies which could help resolve some of the health issues. These new studies have since been released and have been of use in the review process. They differ, however, in their conclusions.

A crucial question about the progressive nature of byssinosis was raised by these research reports, but was not settled by them. OSHA's standard for cotton dust is based on a disease model which assumes that byssinosis begins typically with mild, Monday-only symptoms, and gradually becomes more severe, causing loss of pulmonary function and difficulties in breathing not only on the first workday of the week, but on all other days as well. A study by the National Research Council of the National Academy of Sciences raises doubt about the evidence of the progressive nature of byssinosis. The study questions whether there are eventual, irreversible changes in lung function among employees exposed to cotton dust.

At the risk of over-simplification, I will briefly describe this study and the other major studies that we have depended upon in our review:

1. The National Research Council Study affirms the presence of acute effects of exposure to cotton dust in significant numbers of workers. It concludes that the evidence linking acute and chronic effects is missing or is not strong enough to draw firm links between them. The report calls for further epidemiological research to give a better picture of the relation of acute and chronic stages of byssinosis.

2. The World Health Organization Study, submitted to OSHA in draft form, tends to support the link between acute and chronic effects. It, too, calls for further research in several areas, including identification of the causative agents of byssinosis within cotton dust and other vegetable dusts.
3. The Yale Study, which followed up on active and retired textile workers, described a significantly higher prevalence of respiratory symptoms in both active and retired cotton textile employees as compared to a control population. Moreover, the study also reported some cases of loss of lung function that were apparently not marked by the usual early, reversible symptoms.
4. A study by Dr. Harold Imbus, reporting on medical surveillance of some 40,000 workers, found a significantly lower incidence of byssinosis than was reported in the earlier studies by Dr. Merchant and others. The report finds little or no differences in acute or chronic effects for workers exposed to various concentrations of cotton dust below 500 micrograms.

5. The Knitting Industry Study, sponsored by Cotton Incorporated, compares the respiratory health of knitters with that of other non-textile, blue collar workers and concludes that there was no excess of respiratory symptoms among the knitters and that the prevalence of byssinotic symptoms overall was less than 2 percent.

All of these studies add to our knowledge about byssinosis, but none of them can be called a definitive statement on the subject. We may, I believe, be encouraged by the statistics that came out of the recent studies showing lower prevalences of byssinosis than were reported in the 1970's.

Enforcement Experience

Because of the many delays in establishing the legal status of the standard, OSHA's enforcement activities relating directly to the textile industry have been limited. The deadline for engineering controls is 1984. Until that time, employers are required to implement certain administrative controls and work practice controls.

As a result, we have found few serious violations and a generally high level of adherence to the provisions of the standard in the textile industry. In general, employers are doing the required monitoring and medical surveillance, are training their employees as specified, are providing dust masks for use on partial shifts and have modified work practices so as to minimize or eliminate exposures. We find that employers have, almost without exception, drawn up compliance plans and that in many cases they are ahead of schedule in implementing them.

It is important to note that in the area of enforcement, OSHA shares responsibilities with those States which have adopted their own occupational safety and health programs, as provided in the Occupational Safety and Health Act of 1970. In the case of cotton dust, the States' responsibility is particularly important since a large share of the textile industry in this country is centered in North and South Carolina, both of which have State-administered programs. In those States, as in Federal OSHA, enforcement patterns have emphasized development of plans to lower dust levels by the 1984 deadline, and interim protection of workers through the use of personal protective equipment, especially dust masks.

OSHA has been helped by long-term trends in the industry which have combined massive modernization efforts -- retooling and introduction of new technologies -- with the efforts to comply with the standard. New spinning devices are not only more efficient than old; they also generate far less dust. Chute-fed cards, now installed in what was formerly one of the highest exposure areas in the typical yarn manufacturing operation, now generally have exposures which are at or below OSHA's PEL. While compliance with OSHA's standard has not been cost-free, even for employers with major re-tooling underway, it has been less of a burden than might have been the case if the chosen solution were to have been retrofitting of old, inefficient cards, looms, spinning frames and other equipment.

OSHA's review of the cotton dust standard is now in its final stages, and a proposal will be published in the near future. Mr. Chairman, I can assure you that as the rule-making process advances, we will be open to new evidence pertaining to the control of byssinosis as it becomes available to us. Thank you for your attention.

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